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MAY 1951

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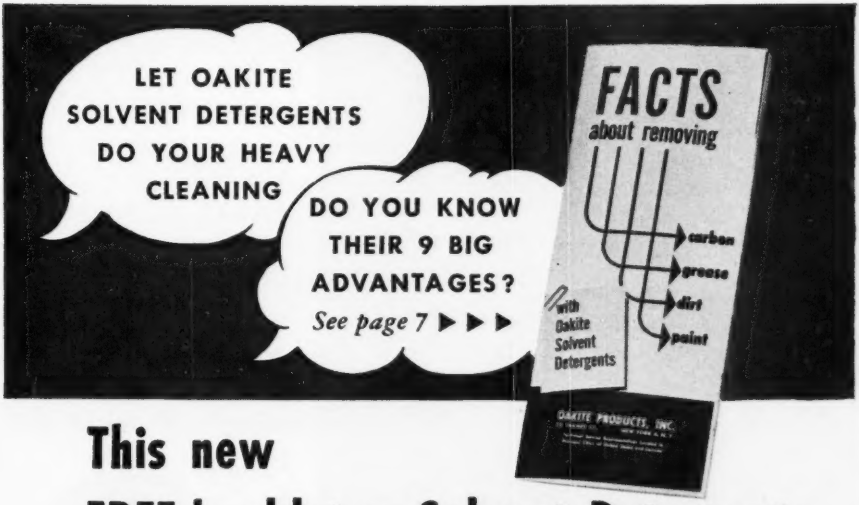

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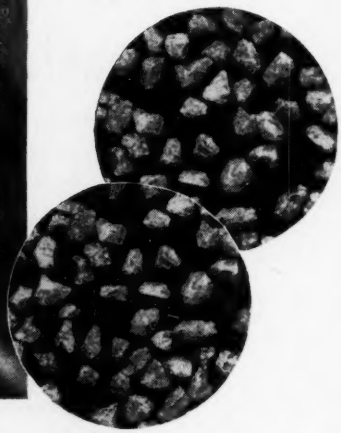

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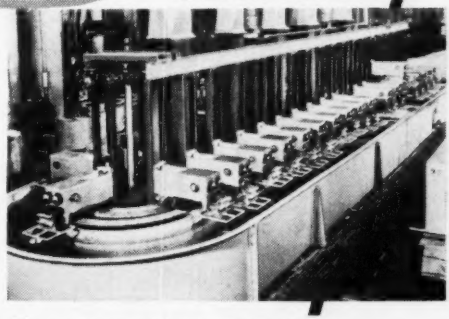

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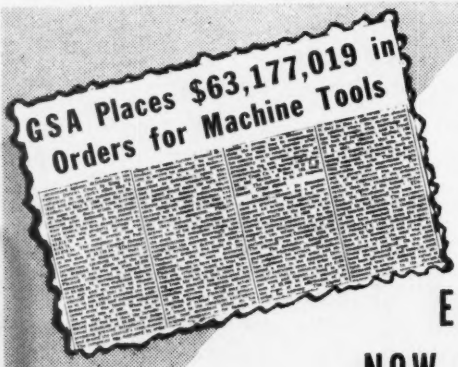

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EZRA A. BLOUNT, *Editor*

Products Finishing

MAY 1951

VOLUME 15 • NUMBER 8

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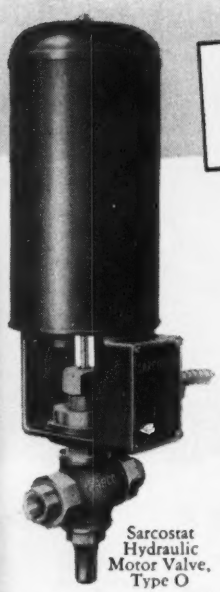

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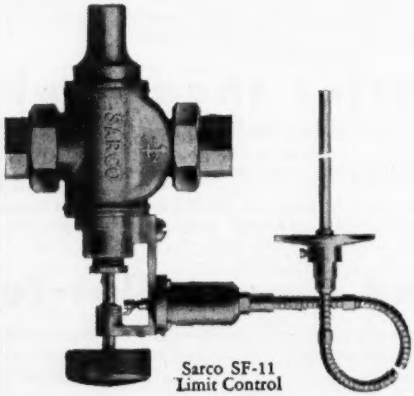

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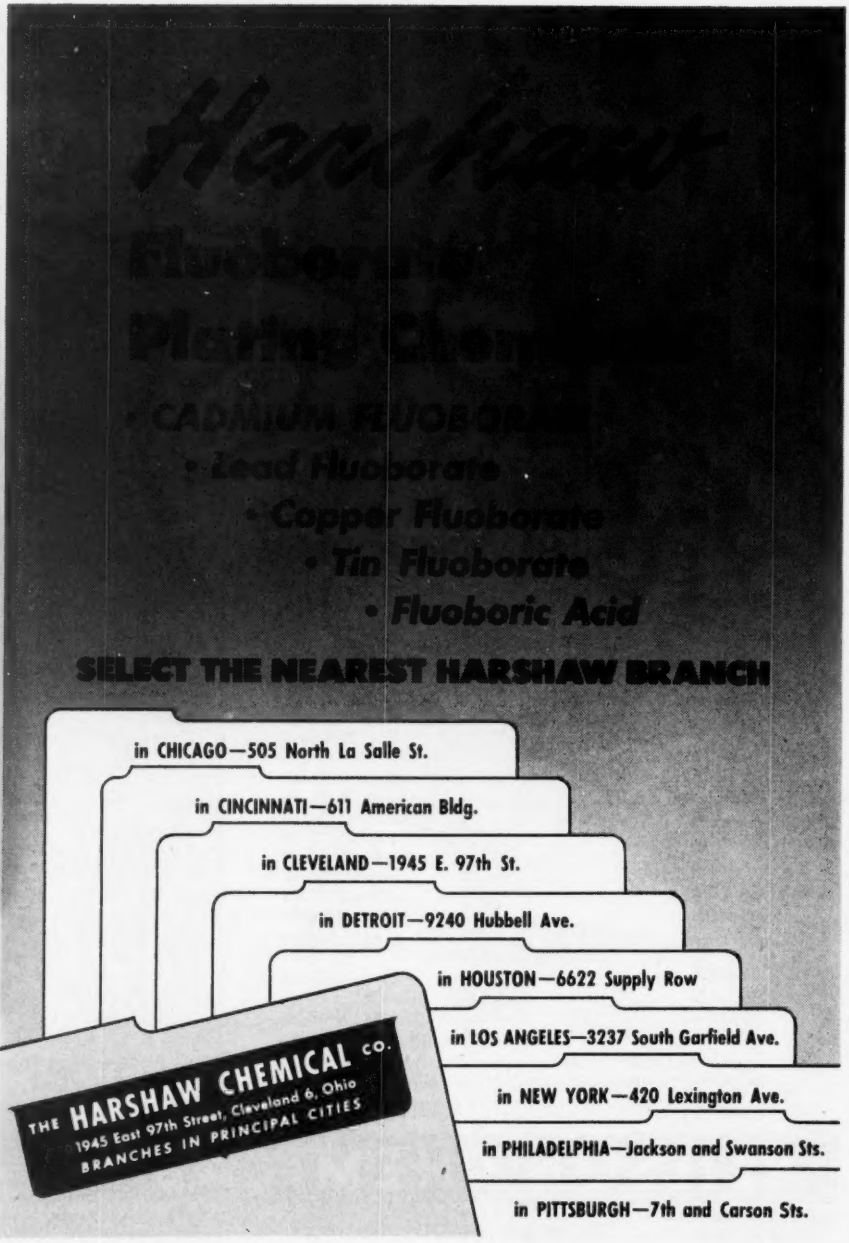
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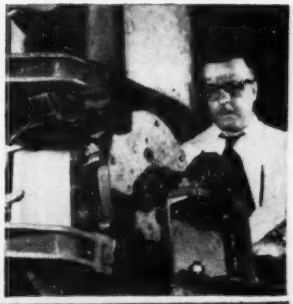

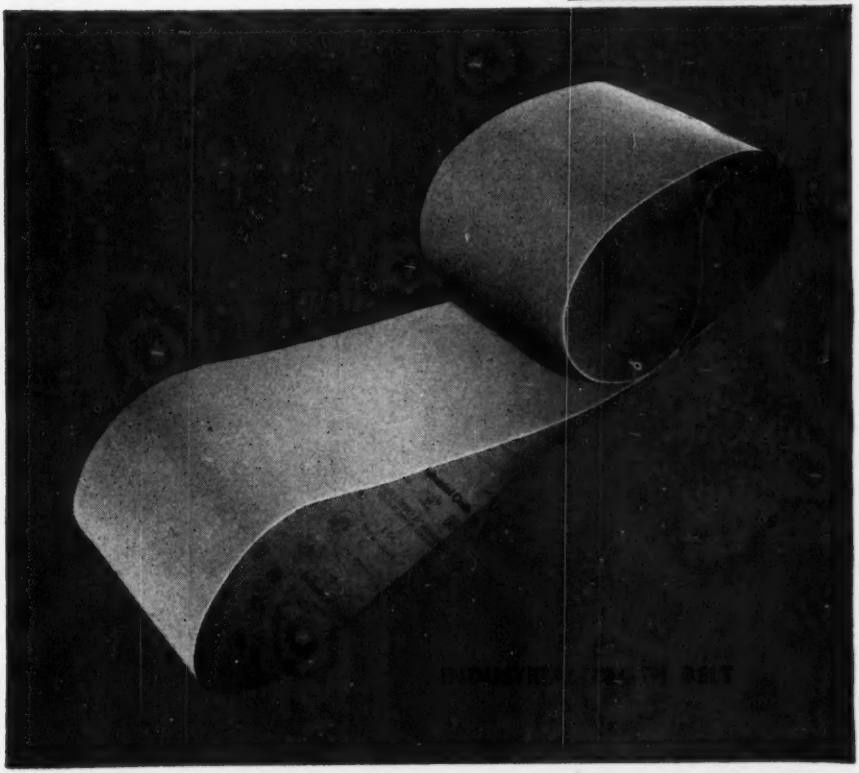

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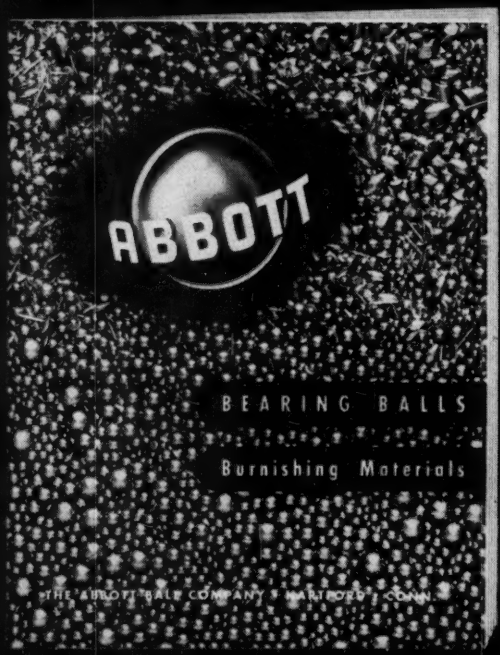

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SODIUM and POTASSIUM are revealed by using flame photometry. The diluted bath sample is atomized in the flame photometer. Intensity of the characteristic light of either sodium or potassium is measured with respect to a standard. Concentration of the ion in the diluted sample is read off a calibration curve.

CADMIUM can be determined after copper and iron are removed by precipitation with cupferron and extraction with amyl acetate. Cadmium is precipitated with 2-mercaptobenzothiazole in an ammoniacal solution and extracted with chloroform. Then it is returned to an aqueous medium by shaking the extract with hydrochloric acid. The solution is made strongly alkaline with sodium hydroxide solution and the cadmium is extracted with a carbon tetrachloride solution of dithizone. After dilution, the extinction of the colored system is measured.

ALUMINUM may be determined colorimetrically after removing interfering metals. Color of the aluminon lake is developed by adding aluminon and a buffer to adjust pH to 5.5 and transmittancy of the lake is measured with a colorimeter.

AMMONIUM is separated from the bath by alkali treatment and steam distillation with a micro Kjeldahl apparatus. The ammonia is treated with Nessler's reagent, and the color developed is measured photometrically.

CHROMIUM: To determine chromate chromium, any reducing agents are oxidized with nitric acid. Diphenylcarbazide is added, the transmittancy of the solution is measured, and the amount of CrO_3 present as chromate read off a calibration curve.

For total chromium, any iron, organic compounds, reducing agents, and chlorides are removed, after which the chromium is oxidized with ammonium persulfate. Transmittancy of the solution is measured and the amount of CrO_3 read off a calibration curve.

ZINC is determined colorimetrically. Copper and iron are first removed; then heavy metal impurities including nickel are complexed with sodium di(B-hydroxyethyl)dithiocarbomate. Zinc dithizonate is formed in the presence of these complexes, when a carbon tetrachloride solution of dithizone is added. After removal of excess dithizone, zinc is determined colorimetrically.

CALCIUM is determined by precipitating the heavy metals as hydroxides, and then separating the calcium from the filtrate by precipitating it as the oxalate at a controlled pH. The calcium oxalate is converted to oxalic acid, and the acid is allowed to reduce a known amount of potassium permanganate. Transmittancy of the residual potassium permanganate solution is then measured.

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Pf editorial

Vol. 15, No. 8

MAY, 1951

A New Mechanical Finishing Technique

An ever-increasing need of the finishing industry, as a solution to manpower and production problems, is the development of improved mechanical finishing methods. Indicative of the continuing trend to supply that need are the new polishing machines and methods employed in polishing zinc base die castings at Ternstedt Division, General Motors Corporation.

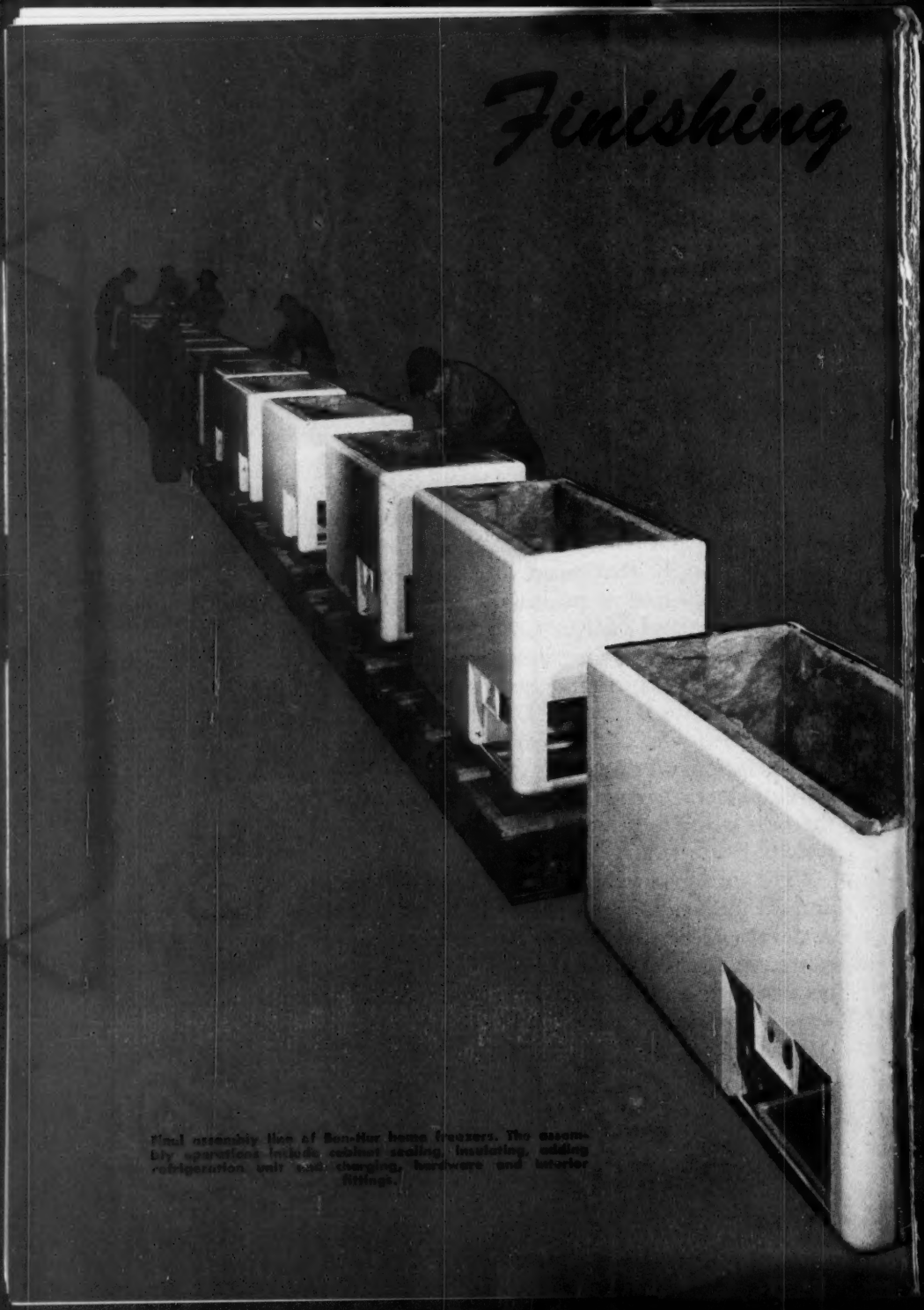
The finishing process, described on Pages 48 and 49 of this issue, is particularly interesting because it represents quite a departure from conventional practice. Developments of this nature can be made only by men who do not limit their thinking and imagination to a consideration of those things which have been done before; such developments typify our continual industrial progress. They are the best possible advertisements for our American free enterprise system.

The finishing industry has currently been plagued by shortages, and the need to select alternate materials and methods in some cases. A development such as the new mechanical finishing technique reported in this issue should be reassuring, particularly in these times, because it shows that men of imagination are constantly devising new ways to fabricate and finish the many products of our civilization "better, faster, and for less money."

Ezra A. Blount

—EDITOR

Finishing



Final assembly line of Ben-Hur home freezers. The assembly operations include cabinet sealing, insulating, adding refrigeration unit and charging, hardware and interior fittings.

Home Freezer Cabinets

Operations in the process of manufacturing and finishing attractive and durable home freezers in a modern plant are described in this article. Reference is made to the use of gas heat in many of the steps included in the fabricating and finishing process.

By ARTHUR Q. SMITH
American Gas Association, New York

MANUFACTURING, as any mill man will agree, is one operation after another by which emerges a finished product. This same mill man will tell you, too, that if just one operation can be by-passed with no loss to production or product, three important gains result. Time is saved; one chance of error is eliminated; and the cost of production is lowered. These factors combined with modern automatic machinery are some of the fundamentals that have made this country the greatest producing nation in the world.

Increasing attention is being given to the greater efficiency of modern industrial equipment and to the adoption of the moving production line where it can be fitted into the plant processes. Today, even tiny watches are assembled by this method, and it is no wonder that a newly organized business in Milwaukee has put this highly efficient technique into practice. The Ben-Hur Manufacturing Company of that city has installed the most modern manufacturing equipment together with modern production methods to produce a line of home and farm freezers in 9, 12, and 18 cubic foot sizes, chest type, in one color only, of durable white baked synthetic enamel. The features that mark the modernity of this plant are the speedy forming presses, power spraying of the finish, high-speed gas-fired enamel baking ovens, and the moving assembly line through to test-

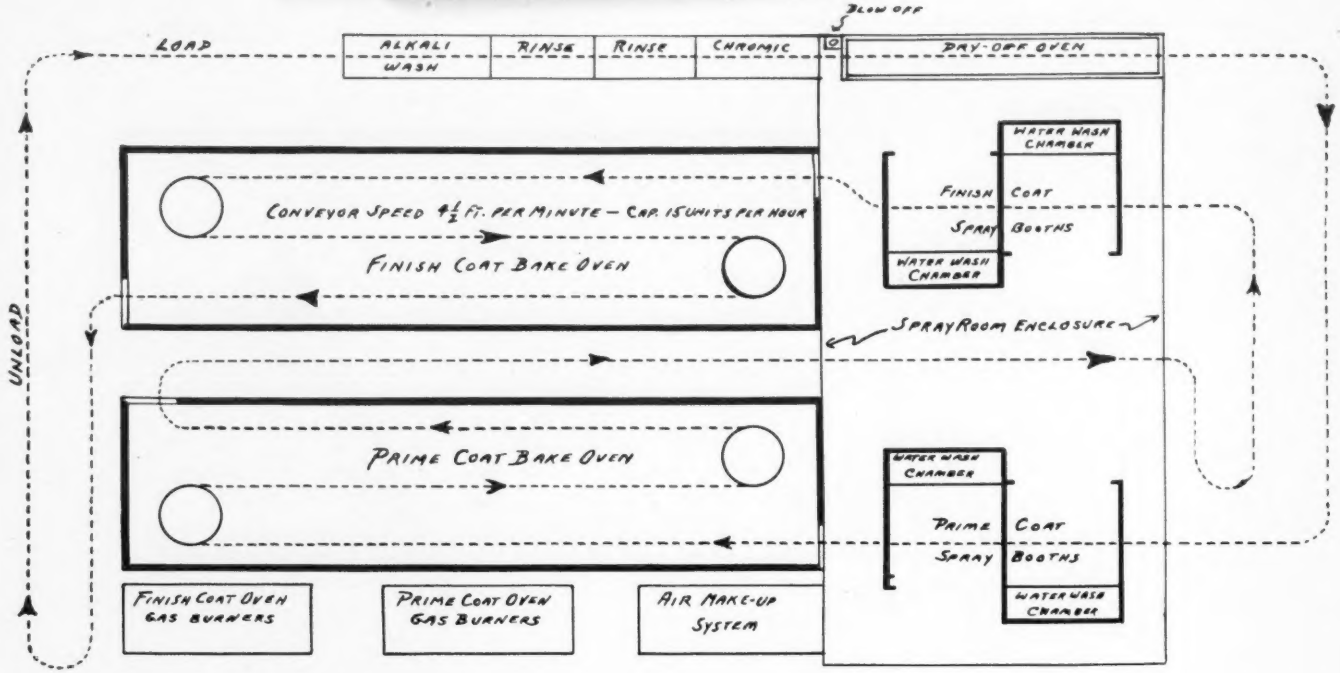


Fig. 1—Flow diagram of the continuous enameling cycle on Ben-Hur Home Freezers. This conveyor system through wash, prime coat, finish coat, and ovens from the loading to unloading point is 1,100 feet long.

ing and final inspection. The major contribution to production efficiency is the continuous conveyor chain for the entire finishing operation. Figure 1 shows the finishing cycle layout.

The modern plant is an all-gas manufacturing plant. In addition to the uses of gas fuel for processing operations, gas is also used for heating the make-up air for the ovens, the entire plant requiring 16,000,000 B.T.U. per hour for these purposes.

Fabrication

In the production of the chest-type freezer, the number of operations in forming and assembling the boxes has been reduced to the absolute minimum. Made of sheet steel, the large sides, tops, and bottoms are first rough stamped to shape. In the next operation the sections are finish formed with rounded edges, and the necessary holes punched. This operation is performed on large presses, each press having a special die for the particular section being stamped. The presses are grouped and scheduled to stamp definite quantities of each section so that a continual flow of the proper number of sections to make a complete freezer is maintained (see Fig. 2). This is one of the results of good production planning, not to have an over-supply of any one part at the expense of other components. Strict adherence to schedule ensures continuous operation on final assembly.

Those sections of the boxes that require parts to be welded to the exterior are attached after the sections have been fully formed and just before they go to the finishing area. The metal parts of the interior cabinet shells are assembled in the same manner as the outer shells, differing only in that refrigerating coils are attached to the outside surfaces of the inner shells. Coil sections are joined by silver soldering, then are leak tested, after which the complete assemblies are run through a dehydration oven to remove any moisture that might remain within the refrigerating coils. This oven is direct gas-fired at 275 deg. F. with burners

Fig. 2—Sheet steel is stamped and preformed for Ben-Hur deep freezers at the new Milwaukee plant.

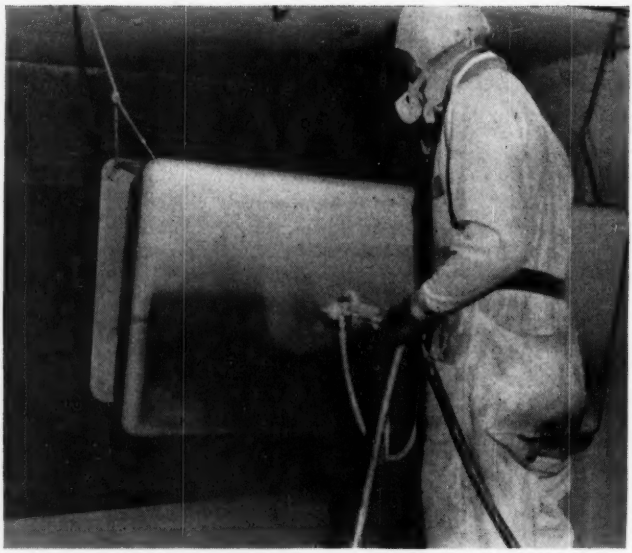
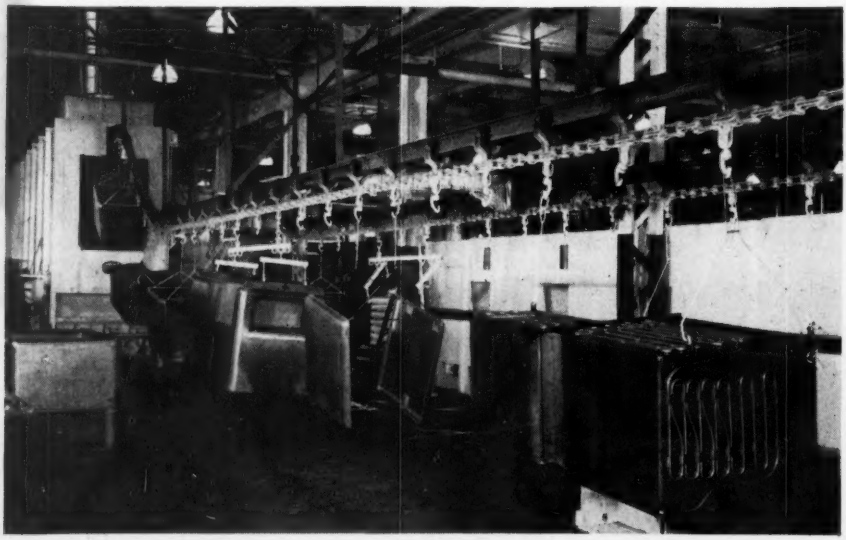


Fig. 4—The finish coat of white synthetic enamel is applied to a freezer section as it passes through a DeVilbiss 516 g.p.m. paint spray booth on the conveyor. Operator in the next booth facing in the opposite direction sprays the other side.

●

having an input of 700 cubic feet of natural gas per hour. After dehydration, the interior cabinet shells are ready for the paint line where metal cleaning, phosphatizing, painting, and baking are accomplished, and here is where the unique 1,100-foot conveyor chain starts. Stamped steel sections of freezers are hung on the conveyor chain in the sequence in which they will be needed for final assembly.

Fig. 3—Partially assembled freezer linings on their way to be phosphatized before prime coat and enamel are applied. Finished freezer panels may be seen on the conveyor chain in the background.



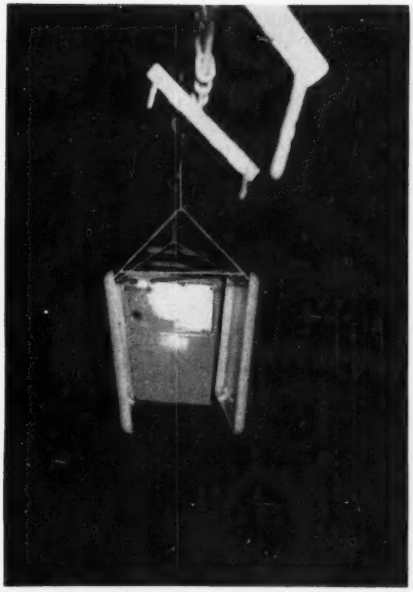


Fig. 5—Finish coated freezer sections being conveyed into the gas heated finish enamel baking oven.

Cleaning and Phosphatizing

In order to secure a perfect base for the synthetic enamel finish on the sheet steel sections, they are first phosphatized. The chain, moving at a steady rate of 5 feet per minute, takes the sections through an alkali (Industrosolv No. 37 and 2X metal cleaner) spray washer, the cleaning solution being heated to 165 deg. F. by gas-fired immersion burners with input of 2500 cubic feet per hour of natural gas (see Fig. 3); then to a 150 deg. F. water rinse; through the Bonderite 1000 solution spray operated at 145 deg. F.; to a cold water spray rinse; to the chromic acid spray heated to 145 deg. F. A compressed air blast removes any excess liquid before the chain carries the parts into the dry-off oven. This oven is gas heated to 350 deg. F. using 625 cubic feet of natural gas per hour. After they emerge from the dry-off oven, the parts travel around to the enamel finishing area.

Finishing

The enamel spray room is a totally enclosed area supplied with filtered, tempered air at a very slight pressure. This is done so that when the access doors are opened for any reason, the clean air will not be contaminated by plant air entering the area. There are two prime and finish coat spray booths

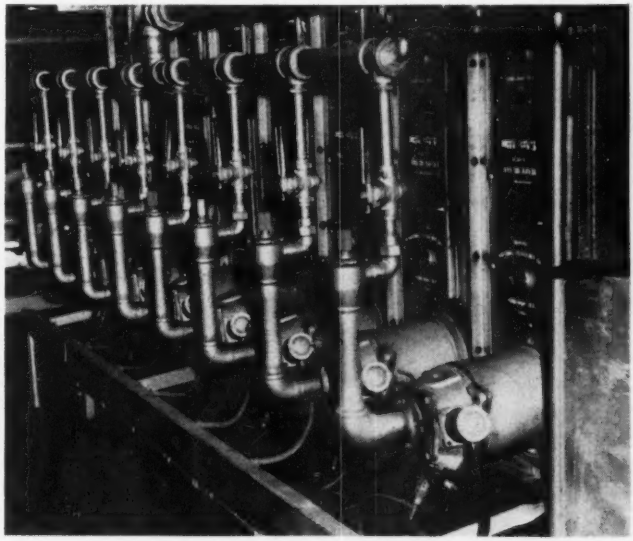


Fig. 6 — Gas burners on the finish coat enamel bake oven.

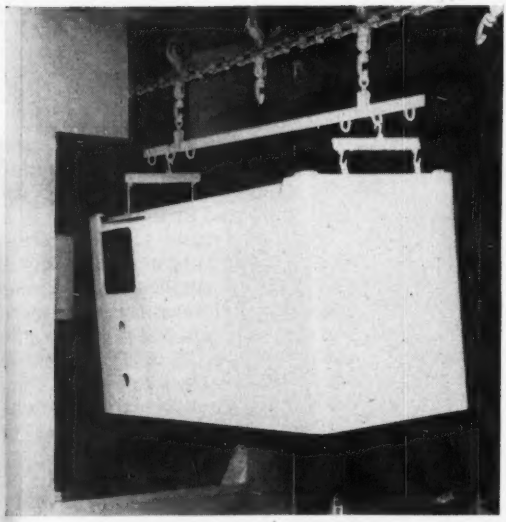


Fig. 7—A completely baked freezer section emerges from the oven.

on each line, and they are set in opposed positions adjacent to one another so that one operator sprays one side of a section and the next operator sprays the other side (see Fig. 4). The back of each spray booth has a water wash chamber to pick up overspray and carry it off as a protection to the operators. From the prime coat spray booths the enameled sections go directly into the prime coat bake oven. This oven is 62 feet long and the conveyor chain makes three passes through the oven to ensure adequate baking of the finish. In the oven, the Glidden No. 976 Hi-Bake white prime coat is baked by means of 300 deg. F. air supplied by a direct gas-fired air heater. This heater has two atmospheric burners with a gas input of 2150 cubic feet of natural gas per hour. This recirculating heater adds enough heated make-up air to carry off the enamel volatiles. The burners are equipped with spark ignition safety flame equipment, and complete automatic temperature controls.

When the sections come out of the prime coat bake oven, there is quite a long run of the conveyor chain to the finish coat spray booths. These spray booths are identical to those used for the prime coat. When the sections have been sprayed with the Glidden No. 9285

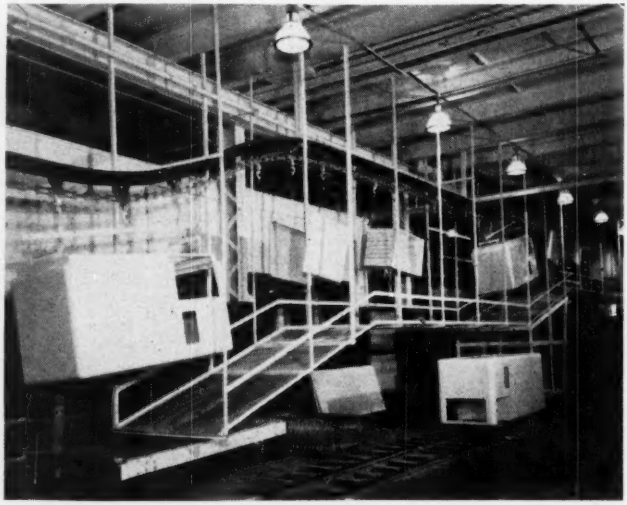


Fig. 8—Here freezer sections in glistening white baked synthetic enamel are unloaded from the conveyor, and placed on the final assembly line.

Hi-Bake white Nubelite enamel, they are cured in the finish coat bake oven which is a recirculating convection type, heated to 300 deg. F. by an indirect gas-fired air heater (see Fig. 5). The burner equipment on this heater contains eight atmospheric burners having a gas input of 190 cubic feet of natural gas per hour (see Fig. 6). On leaving the finish coat bake oven, (see Fig. 7) the conveyor chain passes to an unloading area, and the cycle is repeated (see Fig. 8).

Assembly and Test

The complete assembly of freezers follows (see article heading); this includes cabinet sealing, insulation, refrigeration unit charging, hardware, and interior fittings. When the boxes are finished, they go to final test (see Fig. 9) for a 5-hour period in a room heated with gas-fired unit heaters maintaining a constant ambient temperature of 90 deg. F. From final test the boxes go to polishing, final inspection, packing and shipping.

One of the outstanding contributions to America's high standard of living is the home appliance. A spokesman for a large steel company has recently stated that a home freezer put to proper use by a family of four can easily save $400 per year on the family food budget. It is a fact that the home freezer is on the way to becoming as much a part of household equipment as the refrigerator and washing machine, and the home freezer is well within the means of the average home owner. The

Fig. 9—A final inspection and test is made on each freezer before packing and shipping. *(All photos courtesy Ben-Hur Manufacturing Co., Milwaukee 12, Wis., and American Gas Association, New York, N. Y.)*

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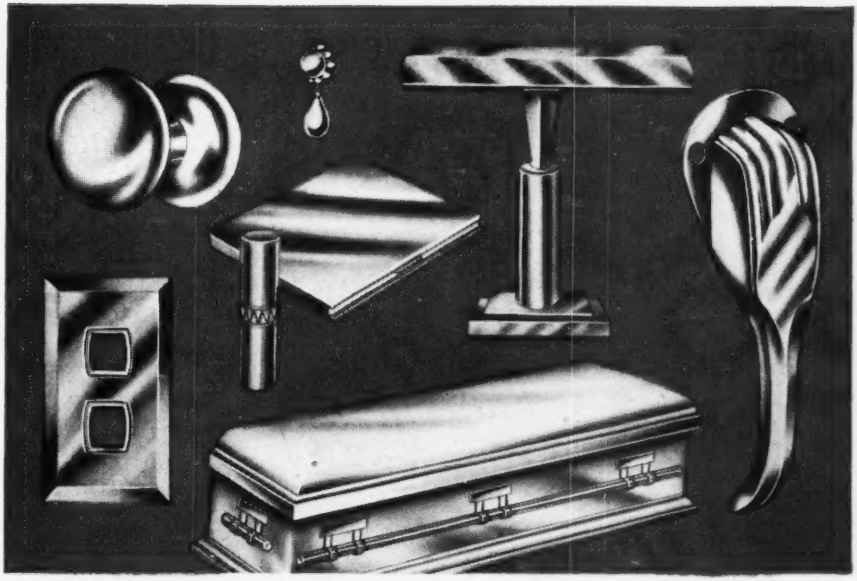

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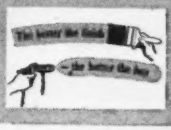

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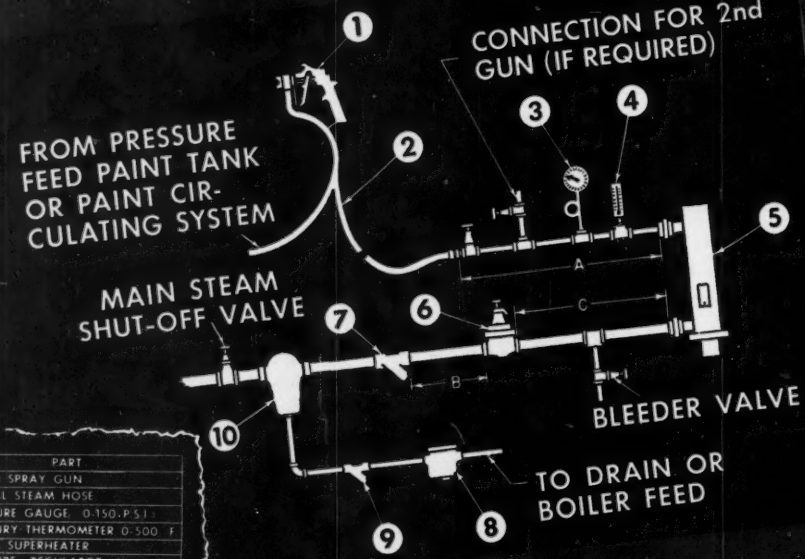

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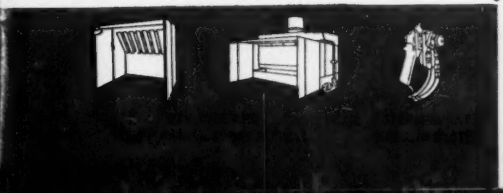

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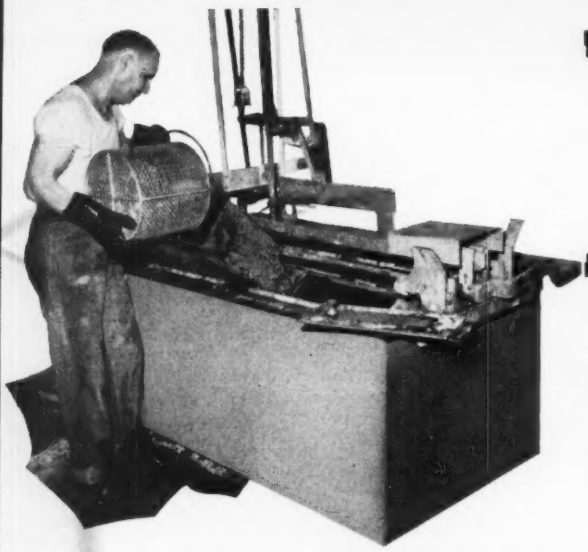

Steel stampings are deburred in a two-compartment tumbling barrel with the aid of abrasives. The stampings are then plated with bright nickel in a plating barrel.

By EZRA A. BLOUNT
Editor

KITCHEN utensils are fabricated primarily from sheet aluminum and steel sheet or coil stock. Utensil bodies are formed from aluminum and polished. Handles for the utensils are stamped from cold-rolled steel, and must then be deburred, surface finished, and bright nickel plated. In the plant of The Peal Manufacturing Company, Cincinnati, an efficient setup for accomplishing the above operations by mechanical means has been designed and installed. Principal items of equipment include a 48-inch octagonal, two-compartment tumbling barrel and a Lasalco 48-inch long, 12-inch dimeter nickel plating barrel, together with necessary accessory equipment.

Barrel Finishing

Barrel tumbling using abrasives and lubricants removes burrs and creates a degree of luster on the parts being processed. The actions are impingement and abrasion, produced by pressures of intermittent duration. Deburring operations (one of the four operations generally grouped under the heading of barrel tumbling) employ a granite or an equivalent abrasive and water and soap or other proprietary compounds.

Stamped steel handles are received from the press department in a clean condition, having been degreased in a vapor degreaser after fabrication. The handles are loaded

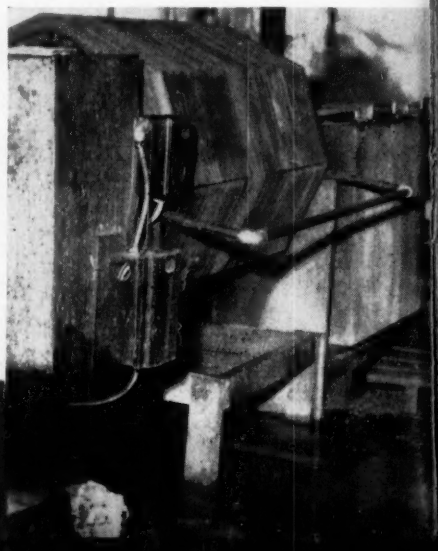

Fig. 1—A view of the octagonal tumbling barrel used for deburring steel stampings at The Peal Manufacturing Company. A simple guard rail prevents operators while the barrel is in motion.

DEBURRING AND PLATING OF STEEL STAMPINGS

into the two-compartment tumbling barrel, shown in Fig. 1, for wet tumbling with an abrasive to remove burrs and prepare the steel surface for the bright nickel plating operation. One barrel load consists of 300 pounds of $\frac{5}{16}$ to 7/32-inch abrasive stones, 40 pounds of steel handles, a few ounces of Fischer's DM 205 soap powder, and 5 gallons of water. The load is tumbled 1½ hours at 12 r.p.m., after which the liquid is drained. The load is rinsed while still in the barrel. After 5 gallons of fresh water and 6 ounces of trisodium phosphate have been added to the load, it is tumbled 10 minutes more, for a total tumbling time of 1⅔ hours. The load is then dumped (see Fig. 2), rinsed thoroughly, the abrasive chips returned to the barrel, and the steel stampings loaded into steel wire baskets for further processing.

Nickel Plating

Steel parts to be plated, loaded into steel wire baskets, are electrocleaned cathodically in a solution of 6 oz./gal. of Wyandotte No. 90, operated at 180 deg. F. As the baskets of parts are removed from the cleaning tank, excess cleaner is rinsed from the work back into the cleaner tank with a stream of water.

Cleaned parts are dip-pickled in concentrated muriatic acid, rinsed, and returned to the alkali cleaner for a second cleaning cycle. After a short immersion, the steel handles are again rinsed, dipped in 10 per cent muriatic acid, rinsed thoroughly, and loaded into the Lasalco plating barrel. Figure 3 is a view of the plating barrel in operation.

The plating barrel cylinder rotates (so that the barrel load is continually submerged) in 200 gallons of nickel solution contained in a rubber-lined steel tank. The nickel solution and operating conditions are as follows:

nickel chloride	6-9 oz./gal.
nickel sulfate	25-40 oz./gal.
boric acid	4-6 oz./gal.
pH	5.2 - 5.8
temperature	140-160 deg. F.
Tru-Brite brightener	100 cc./load
barrel speed	12 r.p.m.

The plating barrel load consists of approximately 40 pounds of steel handles—about 360 parts. The load is plated from 40 to 50 minutes at 120 amperes total current. Current is supplied from a Richardson-Allen

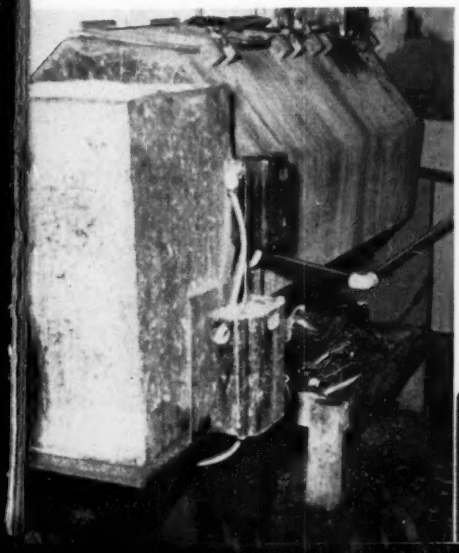

Fig. 2—A load of steel handles together with abrasive particles used for the deburring operation has been dumped onto the separating screen located below the tumbling unit.

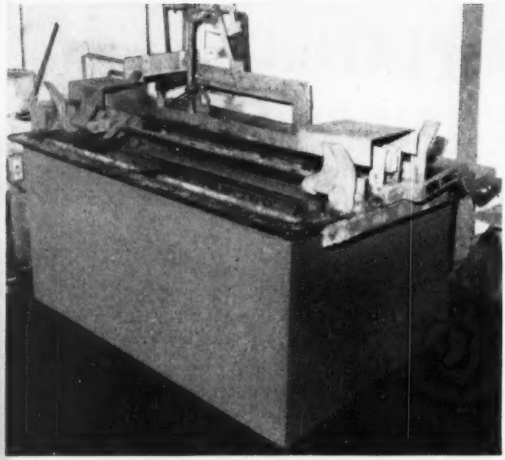

Fig. 3—A view of the Lasalco 48-inch variable speed plating barrel submerged in the 200-gallon bright nickel solution. Bus bars conducting current to the plating tank seen in the left background pass through the plating room wall to the Richardson-Allen rectifier located near the wall but separated by it from the plating room proper.

1,000 ampere, 6-volt rectifier connected directly to the plating barrel, with a smaller bus bar running to the alkali cleaner tank.

At the completion of the plating cycle, the cylinder is hoisted above the tank, and the bright nickel plated handles are dumped into a perforated metal screen, as shown in Fig. 4, so that the nickel solution will drain from the parts back into the plating barrel. While still on the screen, the handles are rinsed with a small amount of cold water, which further removes nickel solution adhering to the handles and minimizes dragout loss.

Rinsed handles are loaded into steel wire baskets, dipped in hot water for further rinsing, and then dipped quickly into an emulsion of Sun Emulsifying Rust Proofing Oil with water. The recommended proportions are 1 part oil to 3 or 4 parts water. The addition of ⅓ oz./gal. trisodium phosphate to the solution keeps the oil emulsified for a longer period of use. This product replaces the water film on the nickel plated handles with a thin, even film of the rust preventive oil.

Handles are dried by tumbling in a rotating open-end brass dryer, 24 inches in diameter and 30 inches deep, as shown in Fig. 5. Since the rust pre-

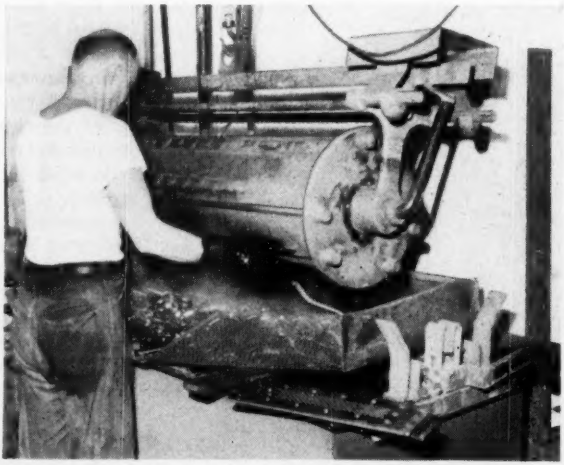

Fig. 4 — Operator is shown dumping bright nickel plated steel stampings from the plating barrel onto a perforated metal screen so that the nickel solution may drain back into the plating tank. A chain hoist is used to raise the barrel to this position for unloading.

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ventive has largely displaced the water film on the plated parts, less water is carried into the cob meal and drying is facilitated.

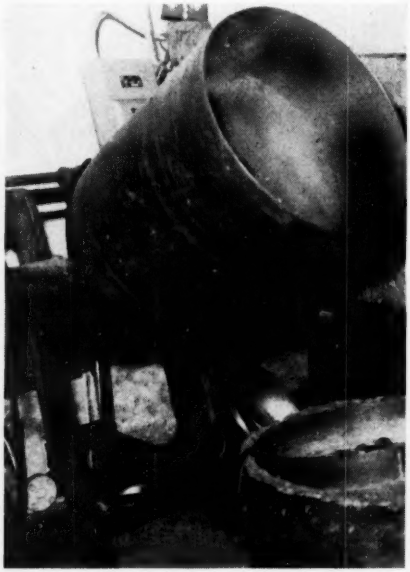

Fig. 5—The brass drying drum shown here rotates in the position indicated, tumbling bright nickel plated steel stampings with cob meal until the stampings are completely dry. The stampings are separated from the cob meal by shaking over a wire screen. (*PRODUCTS FINISHING Staff Photos*)

After drying, the bright nickel plated handles are routed to the assembly department, there to be joined with other parts to form the completed utensil. Assembly of handles to pans and other products is accomplished generally by riveting. The Sun Emulsifying Rust Preventive Oil has the further advantage of preventing fingerprints on plated handles during assembly operations.

The barrel finishing and plating installation at The Peal Manufacturing Company is an interesting example of a completely mechanical preparation and electroplating process.

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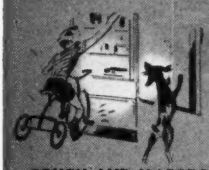

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APPLIANCE FINISHES

Finishing Clinic

In this department are presented some of the questions submitted by readers together with suggested solutions of the problems outlined.

Question. *We have a problem with the emergency finish we apply to irons. The finish consists of a 0.001-inch thick plate of copper which is buffed, chromium plated to a thickness of 0.0001 inch, and then colored. When the irons leave the electroplating shop, they are perfect, but after they are assembled and heated, fine cracks appear in the finish all over the surface. Any suggestions you have to offer for the solution of the problem will be appreciated.*

F. G. H.

Answer. In connection with your problem involving cracks in plated copper, there are certain possibilities which you may wish to explore. In the first place, it appears that the copper deposit is stressed, which may be the result of excessive current density and conditions of solution composition and plating operation, which lead to the absorption of large quantities of hydrogen in the copper plate. This condition is further aggravated by chromium plating in that more hydrogen is thus absorbed.

Plating tests on your copper solution to determine the temperature, solution composition, and current density which produces a stress-free ductile copper deposit should be conducted. You might also like to consider the possibility of annealing the copper plated irons prior to buffing and chromium plating. You might find it equally advantageous to heat the chromium plating irons either in boiling water for 20 or 30 minutes or in an oven at 350 deg. F. for 10 to 15 minutes to reduce the stress in the deposit.

———— fc ————

Question. *We are tumbling* 196-*tooth steel pins in assorted sizes of Alundum grains for burr removal. While this is very successful in removal*

of burrs, it leaves a residue of fine abrasive powder clinging to the roots of the teeth which we have been unable to remove. This powder gets into the lubricant with very unsatisfactory results. Have you a suggestion?

E. L. S.

Answer. When using a finely divided abrasive of the hardness of Carborundum or Alundum, it is quite possible that under heavy and sustained pressure fine points of the abrasive material might be driven into the surface of the softer steel part. Then the projecting end might be broken off, leaving a small stub of abrasive imbedded in the surface of the material itself. Examination of the steel pins under simple magnification will disclose whether an imbedding has taken place, or whether there is only a surface adherence of the abrasive material.

The addition of a wetting agent to the barrel load might be helpful in the case of a friable material that was reduced by a natural process of barrel erosion to a slurry condition. The wetting agent would lower the surface tension of the liquid so that it could reach under and loosen films or residual soil so that they could be readily rinsed away.

H. L. B.

If a dry process is being used, the only way to remedy the situation would be the employment of some subsequent operation for removal of the residual Alundum dust. This could be done dry, using kiln-dried hardwood sawdust or Maizo meal.

If the Alundum is being used wet, then the situation could be improved by using a proper chemical compound in the processing operation. Such a compound should have good cleaning properties, and ability to suspend the dirt load in a manner preventing redeposition on the parts.

C. H. C.

Question. *We are investigating the following methods of finishing baskets and tubs for our Unit Wash washer-extractor and would appreciate your advice on all of them:* (1) *the use of stainless clad steel (cannot be used in perforated basket);* (2) *hot dipped galvanizing after fabrication of both basket and tub or outer cylinder (can exterior be painted?);* (3) *spraying stainless steel on all surfaces after fabrication.*

H. V. D.

Answer. As you have pointed out in your letter, stainless clad steel cannot be used in a perforated basket. Although we are not in a position to furnish you cost comparisons between stainless clad steel and hot dip galvanizing after fabrication, the latter appears to be a reasonably good solution to your problem. It is possible to treat the galvanized surface so that it can be painted satisfactorily.

In general, the spraying of various metals is used in connection with salvage operations to restore worn parts to their former dimensions. We are not familiar with methods involving the spraying of metals used in connection with finishing, but our experience indicates that the surface produced by metal spraying is not smooth enough to be considered as a finish on products such as yours which will be used in laundries.

You have not mentioned the possibility, but either cadmium or zinc plating might be satisfactory finishing methods for use on your products. Corrosion-resistant coatings may be produced by either method, and such coatings may be treated chemically so that paint finishes may be applied where they are required.

DO YOU HAVE A FINISHING PROBLEM?

The editorial staff of PRODUCTS FINISHING is prepared to aid you in the solution of your problem.

There is no charge for this service.

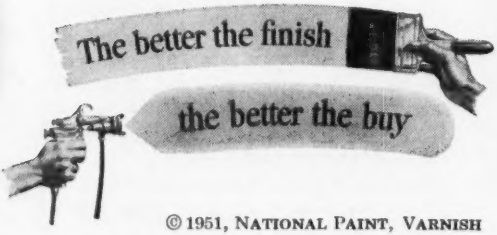
There may be a better way

Consult an Industrial Finishes Specialist

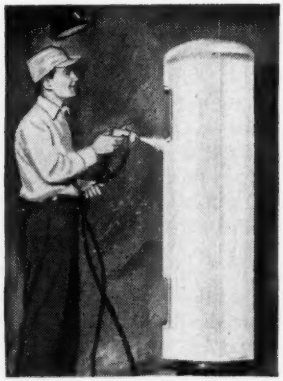
Are you shifting to defense production? Looking for ways to speed up manufacturing, lower production costs, or to increase the quality of your finished products? Call an Industrial Finishes Specialist. A better way to apply your finishes may be the answer.

Here are some of the basic finishing methods in use today. Each method is adaptable to a wide range of products. You may find the answer to your finishing problem here.

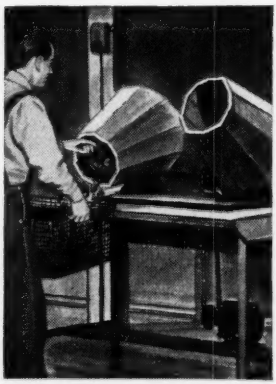
Remember, even in these days of mobilization, *more and more of your customers start buying with the finish in mind.*



© 1951, NATIONAL PAINT, VARNISH AND LACQUER ASSOCIATION, INC., WASHINGTON 5, D. C.



Spray painting—Can be set up for automatic or manual operation and will efficiently handle all types of finishes on all but the smallest objects.

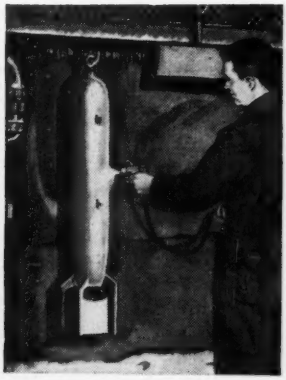


Tumbling—Small wood, metal or plastic parts are finished in batches with a minimum of handling. Inexpensive, and tumbling barrels take little floor space.

to apply your finishes

Electrostatic spraying—Used for metal finishing in automatic spray booths. Eliminates overspray as finish particles are magnetically attracted to the metal.

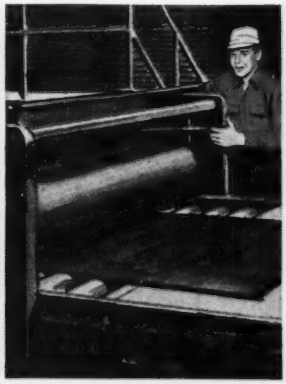
Hot lacquer spraying—Gives improved coverage with one application as heavier-bodied lacquers with a higher percent solid can be used. Gaining increasing acceptance in furniture or wood finishing.



Steam spraying—Gives very even application. Can be used manually, but especially adaptable to automatic spray booth operation.

Dipping—Often the most economical method. Can be set up for manual or automatic operation.

Dip whirling—Same as the dip method, except that excess finish is whirled off by centrifugal force. Only used for very small parts.



Roller coating—Economical high-speed method for applying protective coatings to large, flat and thin objects. Widely used for metals, fabrics, wood and paper.

Practical Advantages Realized Through Hot Spraying of Lacquer

By JAMES A. BEDE
President, Bede Products, Inc.

THE hot spraying of lacquer is now an accomplished reality and it is within the reach of all those who wish to adopt it. In many plants hot spraying has brought about important benefits. In some cases it has cut finishing costs in half. It has now been beneficially adopted in so many plants that there is no longer any doubt as to its feasibility and success.

Every organic finish is affected by temperature variations. Each finish has some one ideal temperature at which it is best applied, and once this ideal temperature is determined, the hot spray process makes it possible to spray constantly at this one ideal temperature. The variations caused by fluctuating temperatures are eliminated once and for all. This is the first time the finishing industry has had an opportunity to spray paint constantly at a selected temperature.

When hot spraying is properly adopted, the viscosity of the lacquer is greatly reduced by heat, eliminating the need for some of the thinners. Also, a uniform condition of operation is established. The lacquer will always have the same temperature and the same viscosity, eliminating the fluctuations that we now normally experience. Further, in the process of atomization, a greater amount of the solvent is dissipated, so that lacquer of higher solids content is deposited on the work.

As a result of these actions, it is possible to obtain a whole series of benefits from the hot spray process. They are as follows:

Savings

1. Less labor
2. Less thinner
3. Less overspray
4. Fewer rejects
5. Less sanding and polishing
6. Less air required per pound of solids

Increased Production

1. Uniform temperature constantly maintained
2. Faster spraying time
3. Fewer number of coats
4. No blushing

Increased Quality

1. Greater depth and fullness of finish
2. Less orange peel
3. Surface imperfections covered better
4. Greater cold-check resistance

Reduced Health Hazards

1. Less spray fog to rebound into sprayer's face
2. Less solvent fumes to inhale

Reduced Fire Hazards

1. Lacquers and thinners can be stored outside of building
2. Less solvent fumes to exhaust from drying room

The major benefit of the hot spray process is the elimination of a large portion of the waste encountered with the normal method of spraying. Hot spraying partially reduces this waste because it lowers viscosity with heat, in effect substituting heat for thinners. Thus, it is possible to deposit more solids with less solvent, with less spraying time, and with less paint loss due to overspray. This is true for all types of finishes, but let us see specifically what happens with lacquers.

For an average cold lacquer, to reduce one pound of solids to a sufficiently low viscosity so that the spray gun can properly atomize it, the addition of four pounds of solvents is required. In other words, in a five-gallon mixture, four gallons are solvents and the rest solids. Of course, the solvents are simply conveying agents which vaporate and become a complete loss. Furthermore, in spraying it is not uncommon to have 50 per cent of the sprayed mixture lost due to overspray. Therefore, we had to mix and spray five pounds of material to deposit a half pound of solids on the product surface. Four and one-half pounds were completely wasted, plus the labor required to spray them. With hot spraying, the loss can be reduced approximately by half. Lacquer is generally heated to a fairly high temperature (160 deg. F.) at which its viscosity is reduced to approximately one-fourth of what it was in the cold state. It then requires from two to two and a half pounds of solvents to carry one pound of solids. A three-gallon mixture has the same solid content and covers the same surface area that a five-gallon

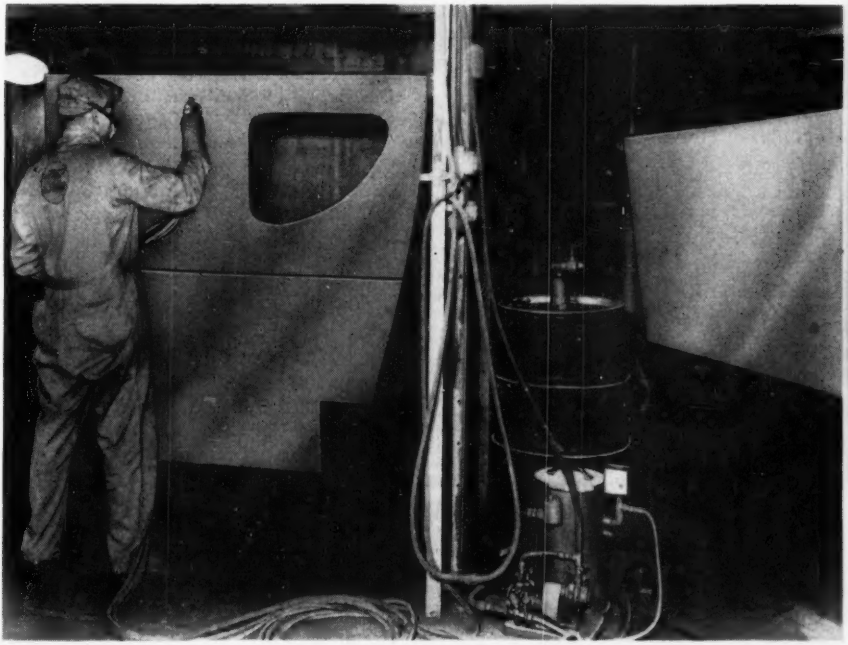


Fig. 1—A view of the hot spray installation made in the plant of the Thew Shovel Company, Lorain, Ohio, by means of which the metal parts are sprayed with the desired finish held at an elevated temperature.

cold spray mixture does. Because the heated lacquer is easier to atomize, the spray gun can handle a somewhat greater volume of lacquer per second of trigger action. For these reasons, there is a distinct possibility of conspicuous savings in labor required to spray a given number of pieces with a given film thickness. In actual practice the output in the spray booth is doubled in a majority of cases. Furthermore, when the sprayers adjust their spray technique for hot spraying, paint loss due to overspray is considerably reduced.

Solvent Dissipation

Aside from the fact that heating lacquer lowers its viscosity, there is another important physical action to consider. The ratio of solvent lost in the process of atomization is greatly increased. In cold spraying aproximately 20 per cent of the solvents in the lacquer that is being sprayed are driven off in atomization. The amount varies according to the distance the gun is held from the surface, the air pressure, the humidity in the air, and so on, but in any event the lacquer deposited on the product surface has a higher solids to solvent ratio than when it left the gun. When the lacquer is heated to 160 deg. F., the solvents are near the boiling point, and therefore a much greater percentage of solvents is lost in atomization—as much as 60 per cent or more. This is very desirable, provided the remaining solvents carry the burden of sufficient flow and leveling action. This makes it possible to spray a much greater film thickness on a surface before reaching the sag point. By hot spraying lacquer, the finisher can duplicate the build and spray performance of other finishes quite readily. One handling, one trip through the spray will accomplish in many cases that which normally requires two separate spray operations. Extra handling and spraying time are eliminated along with the savings in solvents and overspray.

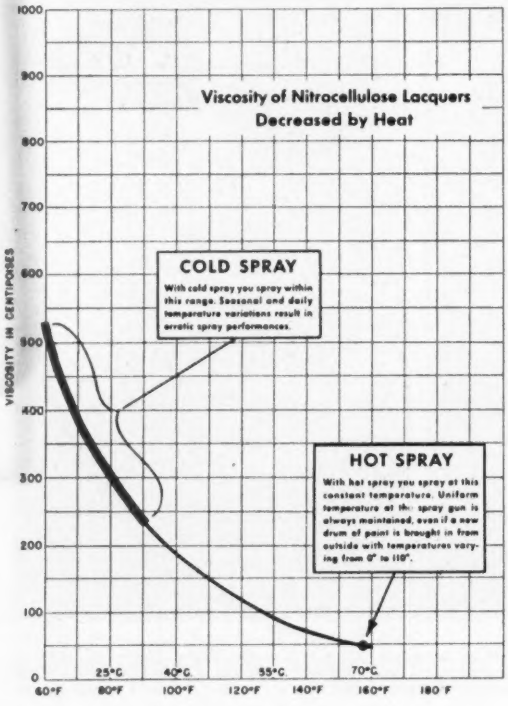
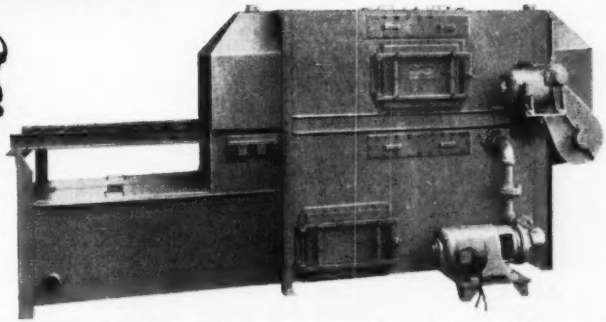


Fig. 2—Graph showing comparison in viscosities between cold and hot spray.

Additional Benefits

The hot spray process increases the utility of lacquers. Lacquer as a finish has some marvelous qualities. Of special interest to the consumer is the fact that it provides a hard, durable finish of lasting beauty. In the factory it is easy to apply and easy to

★ EFFICIENT Defense Production CALLS FOR EFFICIENT Cleaning Methods!



During — and after — the "Second World War" vast improvements in product cleaning methods were inaugurated!

Pictured here, is an A-F Washing Machine which typifies the modern, fast, *efficient* way to remove cyanide from hardened gun parts.

This special A-F Machine with "slo-flo" tank allows cyanide to settle out of the solution—with special arrangements to remove the settling. By simply removing plates, all wash pipes can be cleaned inside without disconnecting the wash system!

Whatever *your* cleaning needs might be, A-F Engineers will gladly cooperate in helping you produce better quality metal parts or products—faster! Write, without obligation, today!

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CONVEYING EQUIPMENT

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WASHING MACHINES FOR INDUSTRY

touch up and repair, for it dries before dust and dirt can settle. Unfortunately lacquer has one drawback in that it requires large amounts of solvents to reduce it to spraying viscosity. Also, it is necessary to apply multiple coats to obtain adequate film thicknesses. With the hot spray process this objection is eliminated, resulting in less material cost and greater labor productivity. In a majority of cases, multiple coats can be eliminated.

A further benefit to be derived from the hot spray process is the reduction of overspray by taking advantage of heat as a viscosity reducing agent, and spraying with the lowest possible atomizing air pressure. We have, on many occasions, reduced atomizing air pressure to one-half or one-third of that used for cold spray, resulting in a minimum of paint loss due to the atomized particles being blown past the object being sprayed. It is also possible to obtain a finish with greater depth and better flowout, requiring less sanding and polishing. Metal imperfections can be covered better because there is less shrinkage to the hot sprayed lacquer film. That annoying seasonal problem, blushing, is eliminated without special retarders.

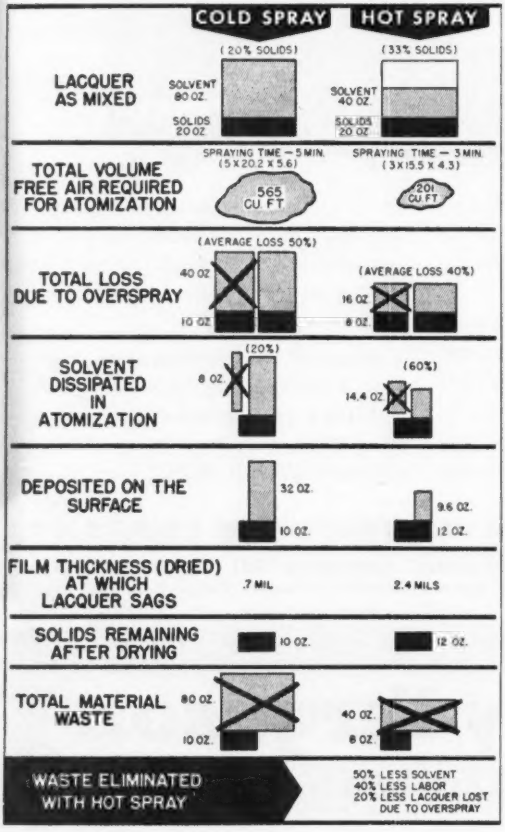


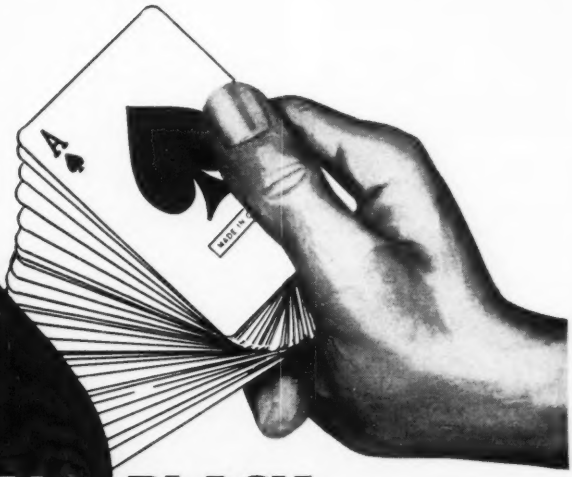
Fig. 3—Comparison of cold and hot spraying.

To successfully accomplish hot spraying of lacquer, there were a number of major difficulties to overcome. First there was the development of a safe and thoroughly practical lacquer heating unit. The second problem was the development of better hot lacquer formulas. The third and most difficult of all was overcoming the skepticism created by previous failures.

Practical Paint Heaters Developed

There are a number of efficient lacquer heaters on the market. Each heater must have a practical, trouble-free circulating mechanism to circulate the lacquer through the heater to the spray gun and return. Pumping hot lacquer presents a number of problems. For example, to keep the shaft seal properly lubricated is difficult by reason of the temperature and chemical nature of the solvents in contact with the seal. A

the BLACK ACE of the Pack



JETAL BLACK

Finish for [redacted]

Only one ace of spades in the pack . . . only one genuine JETAL BLACK finish for irons and steels.

Here's Why *JETAL BLACK* is *ACES:*

SPEED: Goes on in just 5 minutes!

PERMANENCY: Won't chip, peel, crack or dust off even if metal is bent or cut!

ECONOMY: Costs *LESS!*

For *plus* protection — apply JETOIL 1A *after* JETALIZING metals . . . it's the all-around oil-type after-coating.

[redacted]

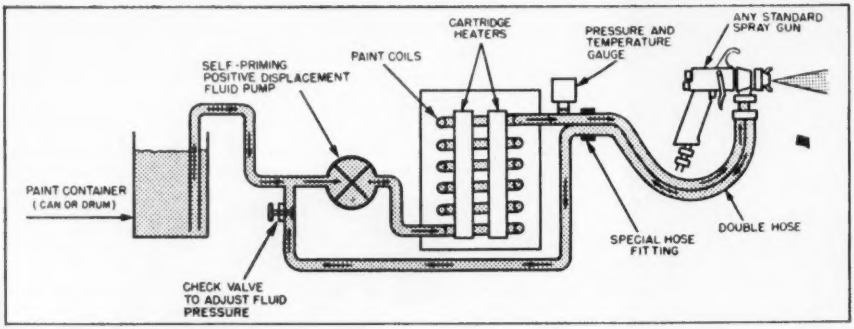


Fig. 4—Flow diagram through single unit circulating type paint heater.

circulating system also must be designed to enable the pump to operate slowly, because hot lacquer does not have the lubricating property that cold lacquer has, and therefore, pigments in hot lacquers have a much greater abrasive action in a cold lacquer. Too, the ordinary thiokol-lined fluid hose commonly used was found inadequate, and had a tendency to swell, causing an interior restriction. Hence, hose life was not only short, but performance was erratic. This has now been overcome and there are fluid hoses now on the market which will perform efficiently when used with hot lacquers.

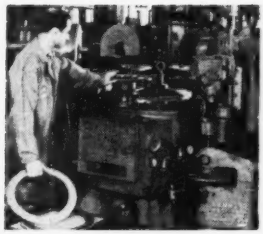
Progress in Hot Lacquer Formulations

Coincidental with the development of lacquer heaters, great progress was made in the development of better hot lacquer formulas. In the interest of developing more information on hot lacquers, an extremely valuable contribution has been made by one of the large manufacturers of nitrocellulose. This concern, which supplies raw materials to lacquer manufacturers, has, for over a year, been conducting thorough and elaborate tests on hot spraying of lacquer. The company assembled lacquer heaters made in this country, plus the best one available in Europe. A year was devoted to thorough analysis of all angles of hot spray formulations and application. Formulations were tested as to durability, print resistance, cold check, and cost. In fact, every important detail in which the lacquer manufacturer and finisher would be interested was covered in this company's hot lacquer research program. Recently, the findings were made available to all the lacquer manufacturers in the country. As a result of this work, better hot lacquers are now being formulated.

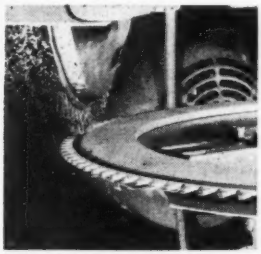
With regard to results obtained from paint heaters under production conditions, a survey is now being conducted by the Hercules Powder Company, Wilmington, Delaware. Returns from a questionnaire mailed to companies known to be using paint heaters indicate a current use of over 200,000 gallons of hot finish every month. The companies responding to the questionnaire report the following benefits obtained through the use of the process:

1. Materials savings (reported by 70 per cent of the companies)
2. Reduced cost of application (reported by 70 per cent of the companies)
3. Improved finish quality (reported by 65 per cent of the companies)

In addition, the following advantages were added by a number of companies on their responses to the questionnaire:



THE MACHINE... *a 5-head rotary automatic is used by this manufacturer to mechanize the brushing of clutch disc teeth. Each brush is powered by a 5 h.p. motor and rotates at 1750 r.p.m.*



THE OPERATION. *Four of the stations brush across the teeth like the one shown above. Fifth station brushes into the teeth.*

What deburrs clutch discs three times as fast?

...*a brush!* To make tractor clutches operate smoothly, all burrs and sharp corners had to be removed by hand-filing and brushing the clutch disc teeth. Now, a five-station rotary automatic machine equipped with Osborn power brushes gets these results:

Triples output. Releases skilled personnel for other defense work. Assures uniform finishing of *every* disc for dependable clutch performance.

An **O**sborn **B**rushing **A**nalyst will gladly study your product-finishing and cleaning operations to suggest ways to speed production and cut costs. Call or write *The Osborn Manufacturing Company, Dept. 448, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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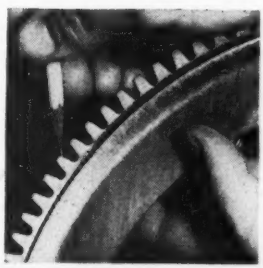
LOOK FOR THE NAME OSBORN . . . RECOGNIZED EVERYWHERE FOR QUALITY WORKMANSHIP AND MATERIALS



THE RESULTS. *Output is tripled. Manpower is conserved. Every disc is thoroughly and uniformly deburred. When clutches are assembled and tested, they operate smoothly and efficiently.*

1. No blushing
2. Quicker drying
3. Better gloss
4. Reduced sagging

What Is Required for Hot Spraying of Lacquer

As is to be expected, there are some who have recently tried hot spraying of lacquer and found it impractical. It is erroneous to assume that hot spraying is an automatic success. To properly adopt it, three basic steps should be considered and each step must be carried out thoroughly. Step number one is a lacquer formulated for hot spray and adjusted to the proper consistency with the right type of solvents. Second, the right type of paint heater should be selected and properly installed. Third, the finisher must approach the hot spray process with an open mind and be prepared to adjust his spray technique correctly to take advantage of the process. This last point is probably the most important for the finisher to observe. Spraying hot material requires a special technique which should be mastered by the spray operator before attempting production spraying.

There are two systems for adopting the hot spray process. One is to make the transition to high temperatures immediately. The second is to approach it gradually. If the first method poses too many complications, it is advisable to start at a modest temperature setting, such as 110 deg. F., and increase the temperature settings in five-degree stages, each time making compensating adjustments in viscosity and atomization pressures. In this manner, the operators have a chance to adjust themselves gradually to the new process. We now have good hot lacquers, we have good hot spray units. There remains the problem of finishers in general being properly acquainted with hot spray technique.

The hot spray process is applicable to all types of organic finishes, lacquers, or synthetics, but carry greater benefits with those finishes that require a proportionately larger percentage of solvents to reduce them to a workable consistency.

It is the opinion of many leaders in the finishing industry that in this decade hot spraying of lacquer is a major contribution to the finishing industry. It is stepping up finishing operations to a much higher plane of efficiency than has ever before been possible.

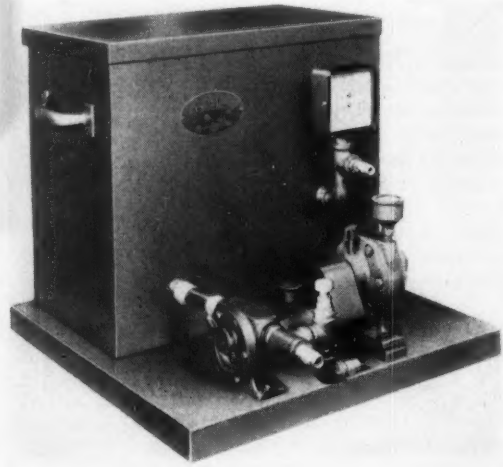


Fig. 5—This Bede Double Unit Paint Heater is designed for larger installations where two or more spray guns are used. It has twice the capacity of a standard Bede Circulating Heater, but in all other features is essentially the same. Constant circulation of the lacquer is provided by the circulating arrangement, which can pump directly from any paint container without the use of a pressure tank. It has the same explosion-proof features, and pressure and temperature are fully adjustable to any desired value.

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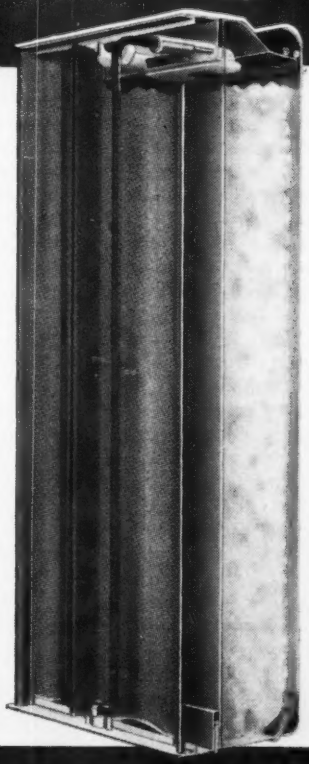
Panel Heat

-for today's changing requirements



TODAY, as never before, plant facilities need to be elastic—ready for change. Whether your changing demands are in product, methods, materials, size or quantity, process heating will come in for its share of *change*. How will you meet the challenge? Panel Heat knows no elastic limit; it stands ready to serve your *known* requirements of TODAY—and with the greatest of ease, your *unknown* production of TOMORROW.

USE IT FOR—

- Booster Units for Existing Ovens and Driers.
- Localized Heating.
- Complete Processing Ovens.

—Wherever heat can be applied from the surface for temperatures up to 650° F.

HERE'S WHY IT'S THE ANSWER—

- Oven wall and heater combined.
- Standard unit construction.
- Rod type, plug-in heaters—for tailored control of heating rates.
- Automatic temperature control.
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Die Castings Polished for and Gyro-Finishing

Reported by EZRA A. BLOUNT

IN addition to the more conventional methods of polishing zinc base die castings preparatory to plating, including hand and automatic polishing and buffing, as well as two different barrel finishing procedures, Ternstedt Division, G.M.C., employs two additional mechanical finishing techniques.

In a recent issue of "Automotive Industries" (January 1, 1951) information was given concerning a unique method of mechanical finishing zinc base die castings preparatory to plating, developed by the Ternstedt Division. The original equipment successfully replaces some of the automatic buffing machines used heretofore by the company.

The mechanical finishing process is called "Fadgenizing." Die cast door handles are mounted on pins or studs attached to cylindrical jigs. A loaded jig is then attached to a power-driven shaft and rotated for 5 minutes (2½ minutes in one direction and 2½ minutes in the opposite direction) at 350 r.p.m. in an abrasive slurry. The abrasive mixture contains the following materials in the proportions indicated:

250 pounds flour silica
12 pounds wood flour (60 mesh)
60 pounds Maizo meal (superfine)
1½ quarts Sav-O-Pine
15 gallons water

The materials are mixed before the water is added, and then the wet mass is mixed again for a period of 45 minutes prior to the beginning of the first polishing cycle.

The Fadgenizing process or cycle is completed by a one-minute rotation of the cylindrical jigs in a water rinse in which abrasive particle removal is aided by a 4-inch bristle brush suitably mounted in the rinse tank. As the jig of rinsed handles is removed from the rinsing solution, water sprays remove the last traces of abrasive material. It is possible to process die cast handles through the abrasive slurry for three full shifts before the mixture must be discarded and replaced. The abrasive material is, of course, added from time to time to maintain the proper level in the slurry tanks.

More recently, Ternstedt placed in operation a faster, more versatile mechanical finishing machine, illustrated here, developed and built by the Process Development Section of General Motors. This newer machine, called a Gyro-Finisher, is massive in construction and requires considerable electrical motor capacity to run. It has four large heads and four operating positions. In the first position a given head is loaded with parts to be finished. When the automatically controlled dwell period has expired, the upper structure bearing the four heads is hydraulically raised, turned 90 degrees, and lowered. The just-loaded head is thus moved to the second position and is then within the first of two continuously rotating tubs. The next indexing movement places it within the second tub. The third brings it to the unloading station while the fourth returns it to its starting position. In some cases, both loading and unloading are accom-

Plating by Fadgenizing at Ternstedt

plished at the first position. Not quite two minutes is required for the complete cycle, which is fully automatic save for loading and unloading.

The polishing tubs, one of which rotates clockwise, the other counterclockwise, are charged with a comparatively dry abrasive mixture which leaves finished parts relatively clean. The abrasive mixture contains the following materials in the proportions noted:

6 gallons liquid buffing compound
2½ gallons water
50 pounds Maizo meal (superfine)

Water is added when necessary to maintain the moisture content between 20 and 30 per cent. Between 10,000 and 11,000 die cast handles may be processed before it is necessary to replace the abrasive mixture. The abrasive material is added to the polishing tubs every hour or so dependent on the amount of dragout.

From the plater's standpoint, an outstanding advantage of the Gyro-Finisher is that it prepares handles for plating without leaving any unsaponifiable buffing compound on the part. Cleaning of parts polished by this process prior to plating is thus simplified.

The Gyro-Finisher is capable of finishing a large number of parts economically. It replaces conventional conveyor-type polishing equipment.

This view of the Gyro-Finisher shows operators loading die cast handles and unloading the polished handles at Station 1. Polished handles may be unloaded at Station 4 (right background), if desired. Station 2 (first of two rotating polishing tubs) can be seen at left of operator on the left. ***(Photo courtesy Ternstedt Div., G.M.C., Detroit 9, Mich.)***

Spotlighting FINISHING Progress

Mechanism of Nickel Electropolishing

EXPERIMENTS on electropolishing of nickel conducted by T. P. Hoar and J. A. S. Mowat and discussed in a recent issue of "Nature" have provided data which may be useful in explaining the underlying mechanism of this operation. The production of a specularly reflecting surface by anodic attack on an initially rough metal is generally thought to involve: (1) the selective removal of metal from the asperities rather than the depressions, and (2) the avoidance of the formation of etch figures on the smoothed surface. Hoar and Mowat pointed out that many investigators have placed emphasis on the first phenomenon, and it has been explained rather vaguely as a consequence of the formation of a layer of high electrical resistance in the liquid next to the dissolving metal; however, the second phenomenon, although of equal importance, has been relatively ignored.

In describing experiments on the electropolishing of nickel, Hoar and Mowat stated that when nickel is made anodic in an aqueous 50 per cent sulfuric acid solution, with or without glycerine additions, electropolishing occurs if the current density is high enough. However, it was pointed out that ordinary anodic dissolution to an etched surface occurs at first and a time interval is required, which is shorter the higher the current density, before polishing conditions are set up. There is a slow rise of

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The Toledo Steel Tube Co. uses the backstand belt method to remove burrs and grip marks from the tubing. This company points out the following advantages of the backstand belt method over the set-up wheel method:

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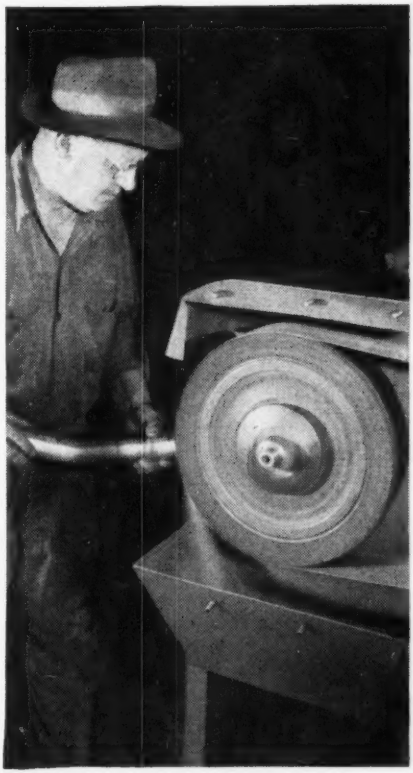

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anodic single potential during this time interval and a large rapid one at the end, whereupon polishing begins.

This phenomenon was stated to be similar to those established for the onset of the anodic passivity of nickel, iron, and other metals in less concentrated sulfuric acid. In this case, the initial production of a rather loose layer of solid corrosion products, formed by precipitation from saturated solution, leads after a time interval to a very high current density locally at the base of pores in the layer. This produces passivity, with evolution of oxygen and cessation of metal dissolution, the original loose layer of corrosion products becoming dissipated.

Hoar and Mowat postulated that in the case of electropolishing the rapid rise in potential observed at the onset is also due to the formation of a compact oxide film on the metal surface; however, the real difference between the electropolishing and passive conditions is that the compact film is readily dissolved by the more concentrated acid necessary for electropolishing, wherein it dissolves as fast as it is formed, and in the case of nickel never reaches a thickness of more than a few unit cells. It was also brought out that many electropolished metals behave, from a corrosion or tarnishing point of view, as if a very thin compact oxide film is left after polishing. It was suggested that this hypothesis for nickel may be quite general qualitatively, differences in various metals arising from differences in the electrical conductivity and ease of dissolution of the oxide, which would lead to varying thicknesses in the steady-state electropolishing films.

Concerning the smoothing effects in electropolishing, the relatively thick layer of saturated solution and solids will be both thicker and less disturbed in the hollows of the surface than on the asperities. Thus, it was postulated that because the film is thicker and less disturbed it would be expected that conditions for passivity would be reached sooner in the hollows than on the asperities, and the resulting great increase in anodic polarization in the hollows will divert most of the current to the asperities. This phenomenon may have a close relation to the smoothing effects of electropolishing solutions.

* * *

Non-Destructive Thickness Testing in England

IN recent years there has been increased interest in instruments adapted to non-destructive measurement of thickness of various types of surface coatings, including metallic coatings, paint, and enamel. Rapid, non-destructive methods are particularly in demand for use in factories

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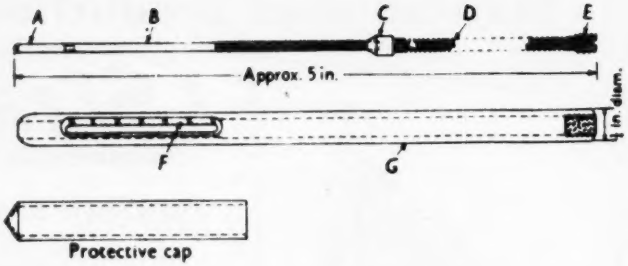

Fig. 1 — Diagram of B.S.A. - Tinsley Magnet Thickness Gage, Type 1. A, Alcomax magnet; B, aluminum tube; C, aluminum bush; D, extension spring; E, brass adjusting screw; F, indicating scale; G, brass tube.
(Illustration courtesy "Journal of Scientific Instruments and of Physics in Industry" —British)

where a high percentage inspection is desired to ensure a certain minimum thickness of plated coatings. Some methods used for coating thickness determinations in England were recently described by R. S. Bennett in the "Journal of Scientific Instruments and of Physics in Industry", published by The Institute of Physics, London.

One instrument, designated as the B.S.A.-Tinsley Magnet Thickness Gage, Type I, was developed for checking the thickness of bright chromium finished parts on cycle parts. The instrument is shown diagrammatically in Fig. 1. It consists of a small magnet attached to a short length of aluminum tube, which, in turn, is attached to an extension spring. The other end of the spring is fixed rigidly by an adjusting screw to the end of the brass tubular casing, allowing the magnet to protrude slightly from the far end of the casing. A short slot is cut out of the casing, and a scale engraved along its length indicates the extension of the spring at any time. In use, according to Bennett, the instrument is brought into contact with the plated article and slowly withdrawn from the surface until the magnet breaks away. At this point, the scale reading is noted, and from a calibration curve such as shown in Fig. 2 the coating thickness is read.

Another instrument, the B.S.A.-Tinsley d.c. thickness meter, Type 2, is operated from a self-contained d.c. supply. The electrical circuit diagram is shown in Figure 3. The instrument consists essentially of two main parts: an exploring head containing the d.c. solenoid and armature which is applied to the plated surface (Fig. 4) and the

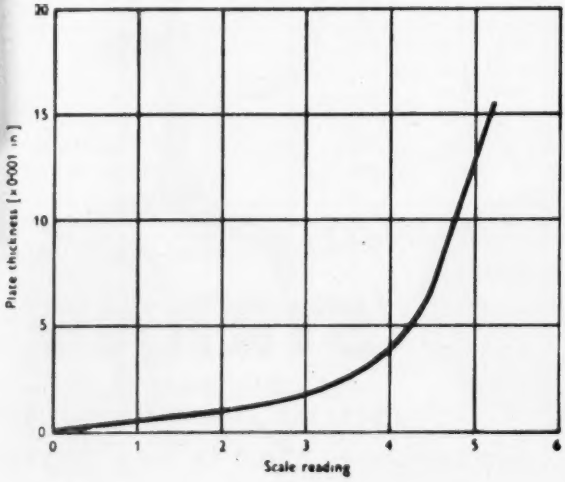

Fig. 2 — Calibration curve for B.S.A.-Tinsley Type 1 Gage
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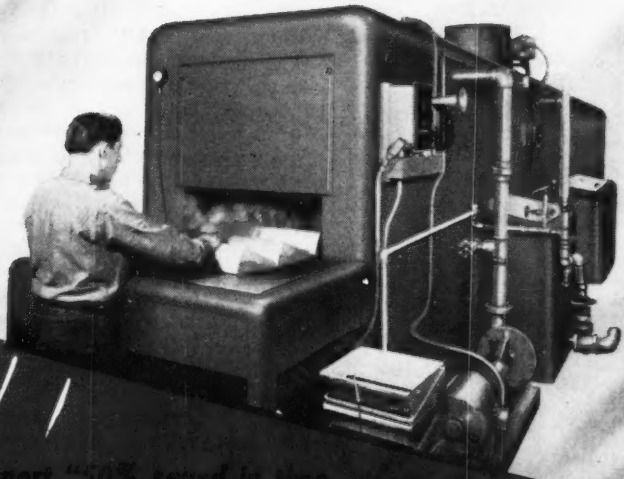

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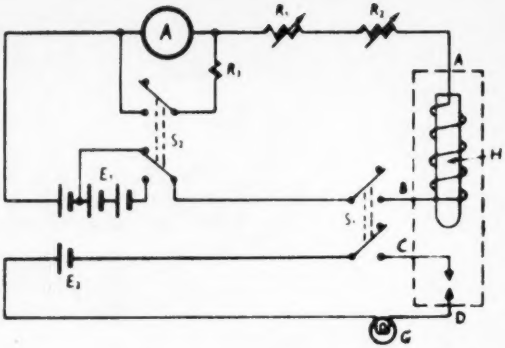


Fig. 3—Circuit diagram of B.S.A.-Tinsley Type 2 Gage. H, soft iron armature.
(Illustration courtesy "Journal of Scientific Instruments and of Physics in Industry"—British)

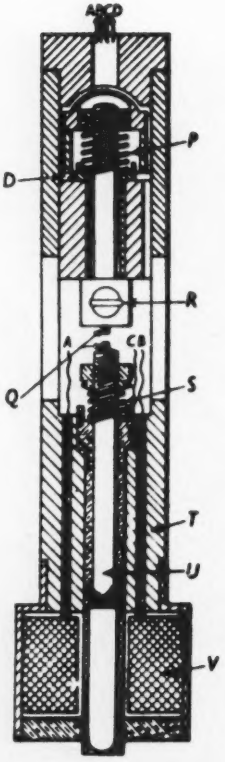


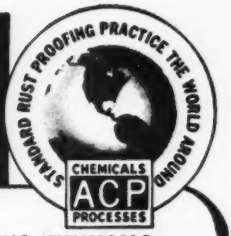
Fig. 4—Diagram of exploring head of B.S.A.-Tinsley Type 2 Gage. A, B, C, D, connections same as in Fig. 3; P, plunger spring; O, lighting contacts; R, lever; S, armature spring; T, Paxolin casing; U, armature; V, coil.
(Illustration courtesy "Journal of Scientific Instruments and of Physics in Industry"—British)

control circuit, including the batteries, meter and control resistance.

The exploring head contains a soft-iron cylindrical armature supported in the center of a coil by means of a short spring. It is so arranged that when the exploring head is applied to a plane surface the end of the soft-iron armature is clear of the surface by about ⅛ inch, providing the coil is not energized. A separate spring-loaded brass plunger is mounted coaxially with the armature in the upper portion of the casing, and on depressing the plunger the armature is moved into contact with the plated surface. If then the magnetic force of attraction of the armature to the magnetic surface is greater than the force of the spring, the armature remains in contact with the surface; and as the unidirectional magnetic field is reduced by decreasing the current in the coil, a point is reached when the magnetic force is equal to the force of the spring and the armature breaks away from the surface, the critical current being a function of plating thickness. Platinum contacts are attached to the ends of the armature and plunger and connected to an auxiliary lighting circuit to provide a visible indication of the point of break.

To operate the instrument, the exploring head is held in contact with the plated surface and the battery

Specification Chemicals for the Government and its Contractors



PHOSPHATIZING, RUST PROOFING AND PAINT BONDING CHEMICALS

Specification Number	*ACP Specification Chemical*
QQ-P-416	"Lithoform," "Zinodine"
RR-C-82	"Lithoform" No. 32
MIL-C-5541 (See also QPL-5541-1)	"Alodine"
MIL-S-5002	"Alodine," "Granodine"
JAN-C-490, Grade I	"Granodine"
JAN-F-495	"Granodine," "Lithoform"
JAN-L-548	"Permadine"
AN-E-19	"Alodine," "Zinodine"
AN-F-20	"Alodine," "Granodine," "Lithoform," "Permadine," "Thermoil-Granodine," "Zinodine" (See also U. S. A. 3-213)
U. S. A. 57-0-2	
Type II, Class A	"Thermoil-Granodine"
Type II, Class B	"Permadine"
Type II, Class C	"Granodine"
U. S. A. 51-70-1	
Finish 22.02, Class A	"Thermoil-Granodine"
Finish 22.02, Class B	"Permadine"
Finish 22.02, Class C	"Granodine"
U. S. A. 50-60-1	"Granodine"
U. S. Navord O.S. 675	"Alodine"
U. S. N. Appendix 6	"Lithoform"
Navy Aeronautical M-364	"Permadine," "Thermoil-Granodine"
16E4 (Ships)	"Alodine," "Granodine," "Zinodine"
AN-C-170	(See MIL-C-5541)
U. S. A. 72-53	(See AN-F-20)
AXS-1245	(See JAN-C-490)

RUST REMOVING AND METAL CONDITIONING CHEMICALS

Specification Number	*ACP Specification Chemical*
JAN-C-490, Grade II	
Type 4	"Deoxidine" Nos. 126, 512, 526, 624, 670
Type 5	"Deoxidine" Nos. 170, 171, 670
MIL-C-10578	
Type I	"Deoxidine" (Wash-off)
Type II	"Deoxidine" (Wipe-off)
U. S. A. 98-20007	"Deoxidine" No. 424
U. S. N. Appendix 6	"Deoxidine"
U. S. A. 3-213	(See MIL-C-10578)

METAL CLEANING CHEMICALS

Specification Number	*ACP Specification Chemical*
JAN-C-490 Grade II	
Type 2	"Ridoline"
Type 6	"Ridosol"
U. S. A. 3-192	"Ridoline" No. 3192

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U. S. N. 51-I-2	"Rodine"

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supply switched on. The indicator lamp (G) should then light, since the armature is in contact with the surface under test. The circuit current is adjusted to a maximum by means of the control resistance and the plunger depressed to bring the armature into contact with the surface. On releasing the plunger, the light is extinguished and the control resistance is then adjusted, gradually reducing the current until the armature breaks away from the plated surface, as shown by the indicator light. The reading of the meter at this point is taken, and the plating thickness determined from a calibration curve such as shown in Fig. 5. With this instrument, according to Bennett, a plate thickness of 0.015 inch can be measured to an accuracy of ± 2 per cent and 0.005 inch to ± 5 per cent. The accuracy for plate thicknesses less than 0.001 inch is of the order of ± 10 per cent. Several designs of instruments operating on the inductive principle are also available. The Lipson thickness tester was stated to have the advantages of simplicity and cheapness, but the accuracy is not as high as for some of the other instruments.

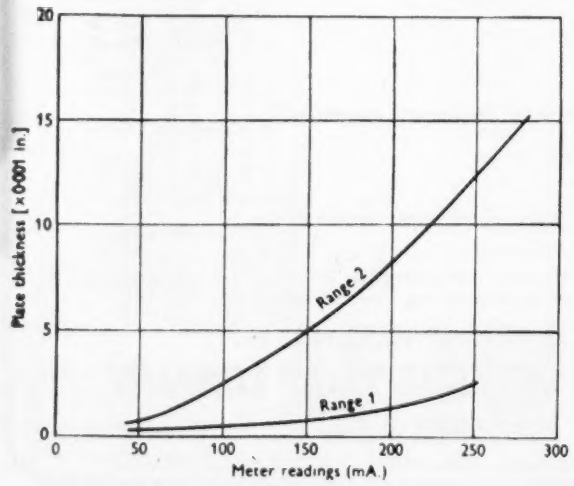

Fig. 5 — Calibration curves for B.S.A.-Tinsley Type 2 Gage.
(Illustration courtesy "Journal of Scientific Instruments and of Physics in Industry" —British)

Evaluating Aircraft Primer Coatings

AS a part of a general discussion on methods used for testing aircraft primers by Douglas Aircraft Company in a recent ASTM BULLETIN, Edward T. Nelson, process engineer, suggests a number of tests that can be used to determine corrosion resistance and film properties of primer coatings. Inasmuch as practically all aircraft aluminum alloy surfaces, according to Nelson, receive a coat of zinc chromate primer, it is necessary that tests be conducted to determine the primer resistance to subsequent top coats of sealants and adhesives, as well as water, hydrocarbons, oils and finishing materials.

In testing lacquer resistance and primer absorption a medium spray coat of primer is applied to nine aluminum panels and after air drying for periods of 10 minutes 1, 2, 3, 4, 5, 6, 16, and 48 hours, respectively, a wet spray coat of lacquer is applied. The combination of primer and wet lacquer is examined to determine the degree of primer absorption by lightly rubbing with the finger. If the primer is completely absorbed, bare metal will be exposed, and if only partly absorbed a portion of the primer film will remain intact. Complete absorption was stated to definitely impair adhesion of the primer to the metal surface. Poor lacquer resistance will result in bleeding and

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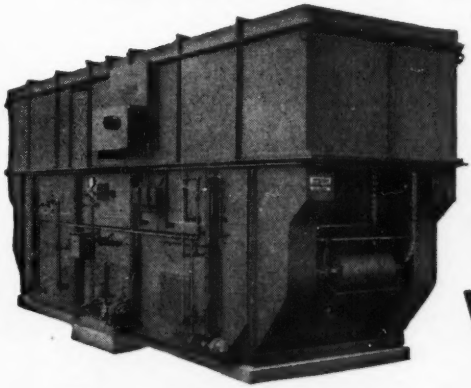

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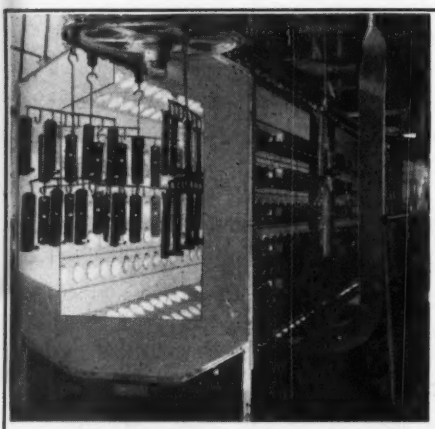
coloration of the top coat and possibly embrittlement, lifting, or other surface irregularities.

In order to test water and hydrocarbon resistance, panels coated with a flow-out film of primer and air dried for 48 hours are immersed in distilled water and in a hydrocarbon. After immersion in the water for 24 hours at room temperature, the primer is examined for evidence of checking or blistering. Two hours after removal from the water the film is examined for excessive leaching, toughness, and anchorage. After 4 hours' immersion in the hydrocarbon, the panels are removed, and 24 hours after removal the primer is examined for toughness, hardness and anchorage. The immersed films are compared with the film on a similarly prepared control panel. Since, in this application, primers are used as a final finish in areas where water and hydrocarbons are likely to accumulate, resistance to such materials is considered necessary.

Weather resistance is determined by exposing panels which have been given a double spray coat of primer and air dried for 48 hours in a National Open-Arc Accelerated Weathering Unit, Type X-1A, employing sunshine carbons and Cordex "D" filters. To be considered satisfactory the primer film must be intact over the complete panel after a 250-hour exposure period. Corrosion inhibition properties are determined by placing primed panels in a salt-spray cabinet for 150 hours.

To test the resistance to sealants, a double spray coat of primer is allowed to dry for periods of 24 and 72 hours, respectively, following which parallel fillets of various sealant materials approximately $\frac{1}{16}$ inch thick by 1 inch wide by 9 inches long are applied with a spatula. The sealant is allowed to dry in a horizontal position at room temperature for 72 hours, then baked at 180 deg. F. for 50 hours to ensure pro-



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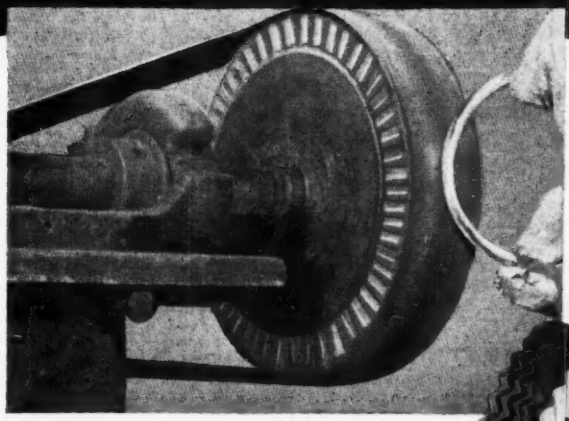

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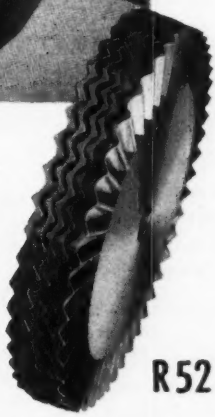

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R 51

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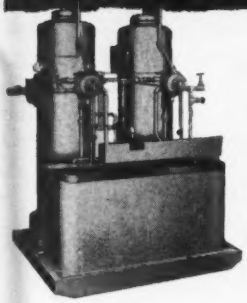

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per curing of the sealant. After cooling to room temperature, a standard flexing test consisting of three bends in each direction over a 3-inch radius is conducted at -40 deg. F. These tests are repeated at -50, -60, and -65 deg. F. The panels are then examined and evaluated for primer absorption by the sealant, effect of the sealant upon adhesion of primer to metal, and adhesion of sealant to primer.

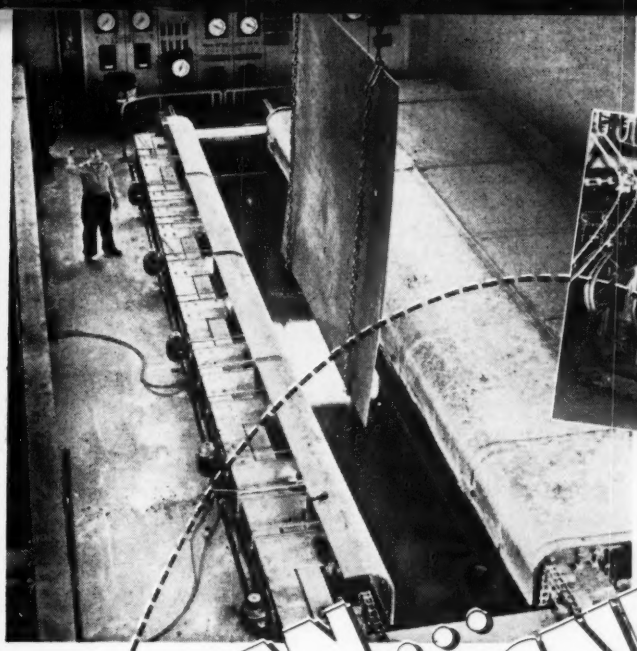
Other tests are conducted to determine the physical properties of the primer coating material; working properties, surface appearance and color of the primer coating are also investigated. Tests are also conducted to determine drying time, and flexibility and adhesion of the primer coating.

* * *

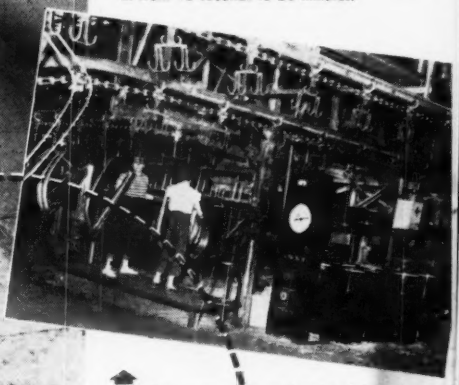
Soft Grits Have Special Properties for Blast Cleaning of Metals

WORK recently reported from the Northern Regional Research Laboratory, U. S. Department of Agriculture, has shown that soft grits, used in conventional blasting equipment, can be used for cleaning and to produce various types of surface finishes. According to T. F. Clark and E. C. Lathrop of this Regional Laboratory, in discussing the possibilities of blasting processes using soft grits in "Materials & Methods" (May 1950), grits from agricultural residues, such as corn cobs, rice and nut shells, can be used in conventional equipment for removing scale and preparing metal surfaces for plating. Machine components cleaned by the soft grit method require no additional machining or fitting for re-use.

Soft grits from corn cobs were developed by the Northern Regional Research Laboratory for use by the Bureau of Aeronautics of the Navy for cleaning and salvaging aircraft en-



Stainless, carbon, alloy and high-speed tool steels and non-ferrous alloys descaled in from 15 seconds to 20 minutes.



Drawing compounds and paint stripped from metal stampings in 50 seconds.

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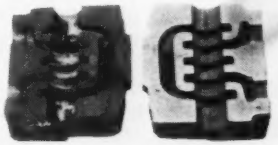

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AJAX ELECTRIC SALT BATH FURNACES

TABLE I

Results of Blasting Tests on Soft Grits Conducted at Northern Regional Research Laboratory Showing Rate of Paint Film Penetration

Type of Grits	Penetration Time, Sec.	
	Grits Only	Grits Plus Rice Hulls
Hardshell Almond Shell	9	7
Softshell Almond Shell	9	7½
Apricot Pit Shell	11½	7½
Cherry Pit Shell	7	3
Coconut Shell	4	4½
Corncob, Commercial		
As Received	—	—
Screened	—	—
Air-separated	22	20
	22-35	10
Filbert Shell	6½	5½
Peach Pit Shell	5½	5½
Pecan Shell	5½	7
Black Walnut Shell	4	4
English Walnut Shell	5	5

(*Courtesy MATERIALS & METHODS*)

gines during World War II. Cleaning action of the corn cobs was further accelerated by the addition of rice hulls. It is reported that this combination, after considering availability, first cost, period of usefulness, and operating efficiency, was adopted and widely used for cleaning airplane cylinders and pistons with no change in dimensions and no pitting action. In addition to corn cobs, several other types of agricultural residues, particularly the shells of nuts and fruit pits, were reported to have physical characteristics suitable for blast cleaning operations. Blasting grits from coconut shells and shells of pecans, English and black walnuts and peach pits have also become available commercially.

In the work carried out at the Northern Regional Research Laboratory, the comparative useful life of the various grits was determined by blasting them at right angles to the surface of a steel plate for 1 hour. A distance of 5 inches was maintained between the blast nozzle and the steel plate. A study of cleaning efficiency or abrasive character was made by blasting the grits against steel panels coated with six layers of baked-on-resin-base paint at a nozzle distance of 3 inches. Typical penetration times, taken as a measure of cleaning efficiency, are given in Table I. To evaluate the grits with respect to pitting, polished brass and aluminum were blasted for periods of 5 minutes with each of the various grits.

For general cleaning, the grits from nut and fruit pit shells, with or without rice hulls, were recommended. It is reported that welding scale is effectively removed from fabricated steel plate by grit-rice hull mixtures, and the surface of the metal is stated to be satisfactory for painting. Because soft grits do not cause pitting, this method appears to be superior to the practice of using steel grits in many applications. Cleaning by soft-grit blasting is especially effective where the surface

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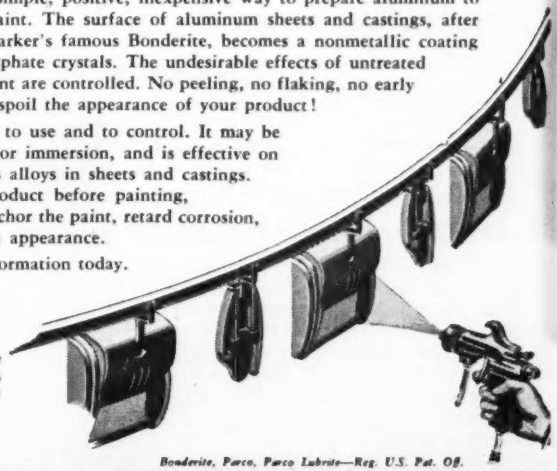

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of the metal under its coating of dirt, scale, and carbon should remain unchanged or otherwise unimpaired. Blast cleaning of metal surfaces prior to plating or galvanizing is another suggested application for soft grits. Hot-dip tinned and plated parts are reported to acquire a satin finish even under extremely mild blasting conditions. Modification of grits and procedures are being studied at the Regional Research Laboratory in an effort to develop acceptable polishing and burnishing methods using soft grits.

* * *

Polishing and Buffing Zinc Base Die Castings Prior to Plating

POLISHING and buffing are generally recognized as important parts of the finishing cycle prior to plating zinc base die castings. One point brought out by Guy M. Cole, engineer in charge of Process Engineering and Laboratories, Ternstedt Division, G. M. C., Detroit, in discussing finishing of automotive die castings before the Toronto Branch, American Electroplaters' Society, at its Annual Educational Session, was that, in general, wheel speeds used at the Ternstedt Division are slower than those usually described in the literature. He emphasized that their experience has shown that slower speeds give a better finish at lower cost.

Examples cited to illustrate speeds used for polishing was the range of 6050 to 6400 ft./min. for automatic polishing and 4850 to 9320 for hand polishing. In the case of buffing, a range of 1980 to 6980 ft./min. was described as satisfactory for use with automatic equipment, depending on the type of work being handled. Figures were given to show that re-

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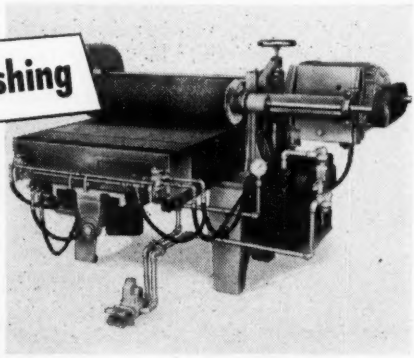

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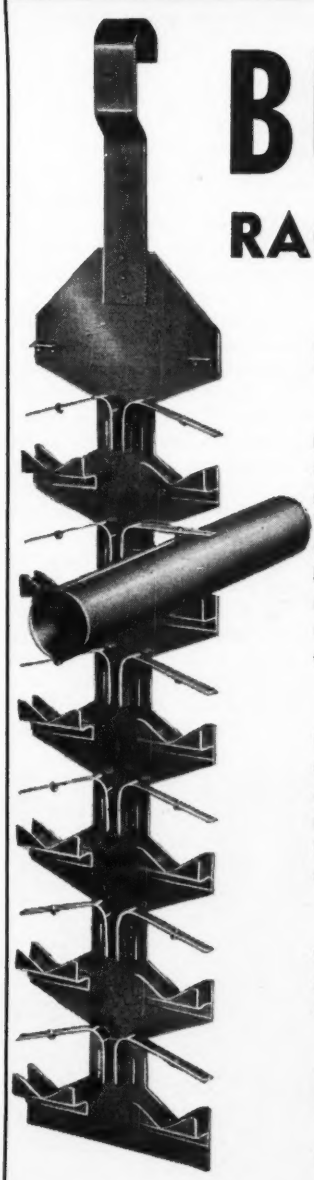

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Where baking ovens are not available, then AIR DRY insulation is indicated. BUNATOL No. 785 is a solution of the same materials used in the Paste, but dries by evaporation of the solvent. Air Dry can be put on by dipping or with a brush. When enough coats are used, it makes a good tough insulation for racks in all classes of service.

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Fig. 6—Hand buffing operation on a zinc die cast automotive part. *(Photo courtesy Ternstedt Division, GMC, Detroit, Mich.)*

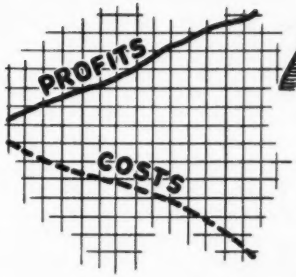
ducing the speed of these operations resulted in reduced compound and wheel cost for finishing. Figure 6 shows a hand buffing operation on a zinc die cast part. Wherever possible some form of automatic equipment is used in preference to strictly hand polishing or buffing. Figure 7 shows automatic equipment being used in polishing and buffing automotive die castings at Ternstedt.

Mr. Cole emphasized the need for quality castings as a necessary preliminary to quality finishing. He said that a good die casting might be defined as one requiring polishing on the parting line only. However, it is generally recognized that the as-cast surface of die castings which are to be electroplated must be sound and free from surface porosity, run marks, and similar defects if a high quality, enduring, plated coating is to be had. Thus, the quality of the surface of the die casting greatly influences the labor required to prepare it for plating and also the quality of the finished piece.

According to the recommendations** of the New Jersey Zinc Company, polishing which tends to cut through the outer skin of the die casting should be avoided as much as possible. Lineal speeds for polishing are reported to vary from 5,000 to 10,000 ft./min., with about 8,500 ft./min. being most frequently used. Wheel diameters range from 8 to 14 inches in commercial practice, with a preference being reported for the 14-inch size. Polishing with abrasive belts is on the increase for many types of die casting finishing operations.

Another possibility that has been pointed out by The New Jersey Zinc

Fig. 7—Automatic equipment used in polishing and buffing automotive die cast parts. *(Photo courtesy Ternstedt Division, GMC, Detroit, Mich.)*



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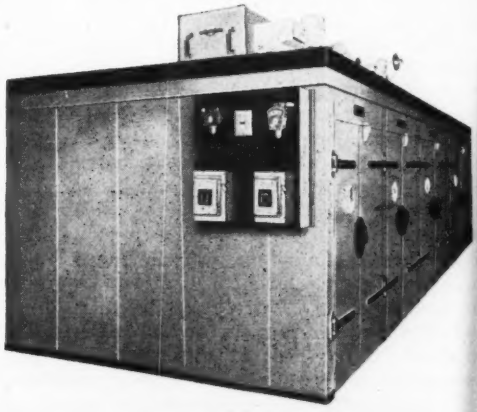

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Company, for use where the parts are somewhat complex in shape and contain cored holes in the significant surfaces, is the use of greaseless compounds with flexible wheels. This reduces the limitations imposed by the comparative rigidity of set-up wheels. A wide choice of commercial compounds are available for such applications.

After the polishing operation, zinc base die castings are generally buffed to a high luster prior to plating. General experience** has been that buffing or cutting down is best done with tripoli on cloth wheels. These may vary in stitching pattern and in hardness, depending on the shape of the piece being handled. It has generally been found desirable to increase the number of stitches, and hence the hardness of the wheel, as the surface to be buffed approaches a flat surface. It is important in the case of zinc that the tripoli used be free cutting, since excess pressure results in dragging and waviness. A peripheral speed of about 8,500 ft./min. is used in many buffing operations.

Satisfactory coloring can also be achieved with cloth wheels using a dry, soft compound. The compound should be dry and free from lime, since excess grease makes cleaning difficult and the presence of lime makes both cleaning and rinsing harder to accomplish. Combination cut and color compounds are sometimes used to produce a luster intermediate between those obtainable by a straight cutting down operation and by a coloring operation. In the selection of a buffing compound, it is important to bear in mind the compatability of the compound binder with the cleaning system which follows.

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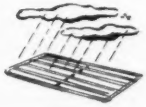
whether your product must be finished for corrosion  resistance, or paint adherence, or with eye-appealing brightness, or in a variety of attractive colors, there's an **IRIDITE** to do the job!

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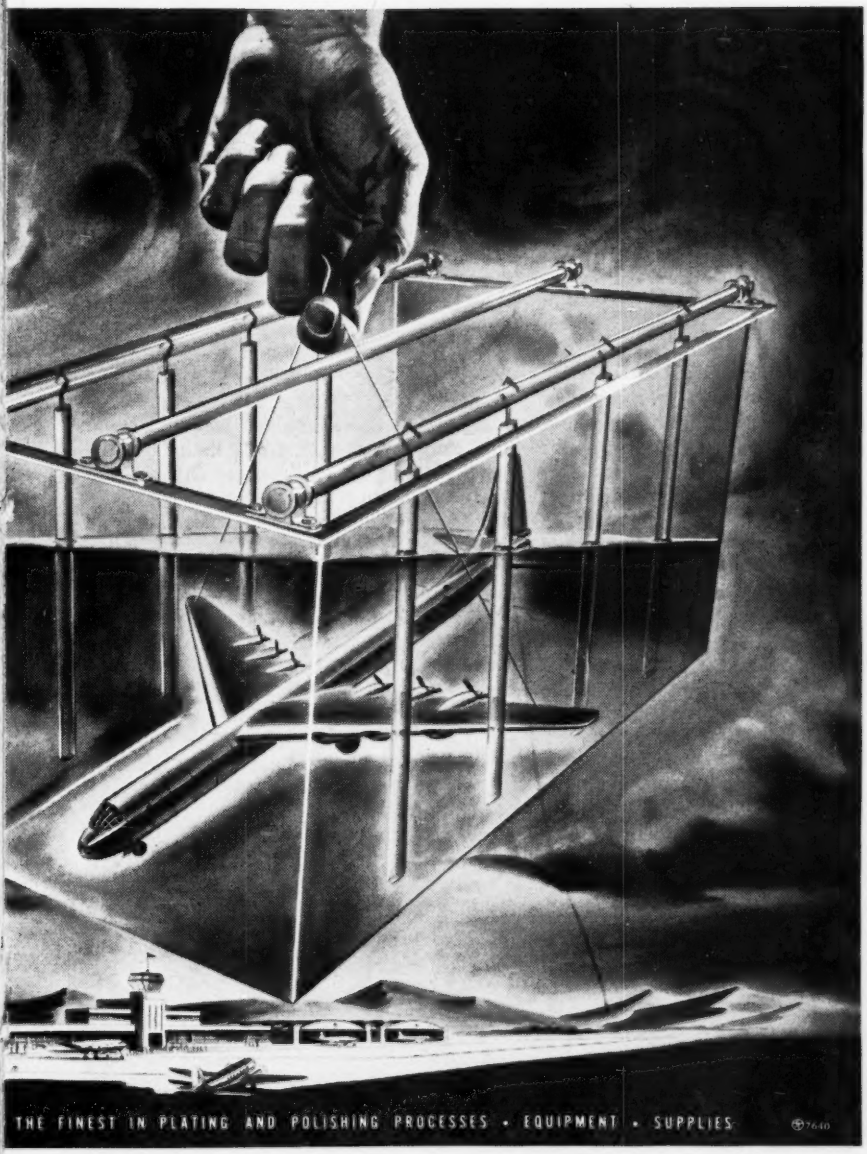
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Low Ceilings No Obstacle to Oven Installation in This Finishing Plant

WHEN the Atlas Manufacturing Company of St. Paul, Minnesota, producer of furnace casings and boiler jackets, decided to modernize the finishing system recently, the problem of securing overhead oven space in a building with a low ceiling confronted them. The problem was quickly solved, however, and the installation was made with the ovens, together with all oven heating equipment, built on the plant roof (see Figs. 1 and 2). The 600-foot conveyorized finishing system was designed, built, and installed by Despatch Oven Co., Minneapolis, Minnesota.

The Atlas installation depicts the modern trend in high production finishing. The company has already proven to its own satisfaction the numerous advantages to be realized in the operation of a continuous conveyor finishing system and conveyorized high efficiency ovens. The new system includes a Despatch burn-off oven for degreasing, and a Despatch finish bake oven, both located on the roof of the plant. This has given Atlas approximately 800 square feet more plant floor space, which is used to good advantage, especially in the conveyor loading and unloading areas.

H. E. Kerr, plant superintendent, states that he is quite pleased with the process and the equipment which has been installed. The new system is rated at 100 complete cabinets in eight hours, operating at a conveyor speed of ten feet per minute. This is a substantial increase in production, which has been at-

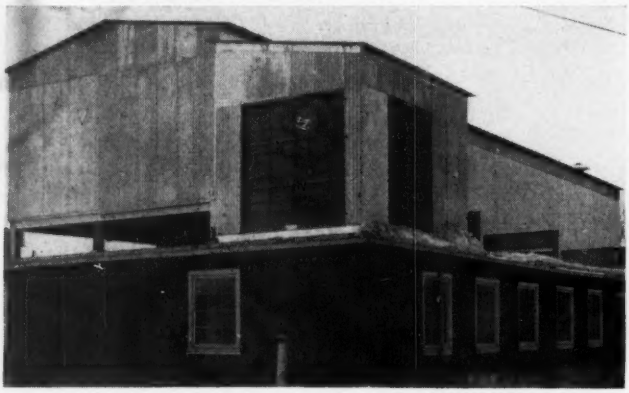


Fig. 1—This imposing rooftop structure contains the burn-off and finish bake ovens of the Atlas Company's modern conveyorized finishing system. The windowed section houses the oven heating equipment.

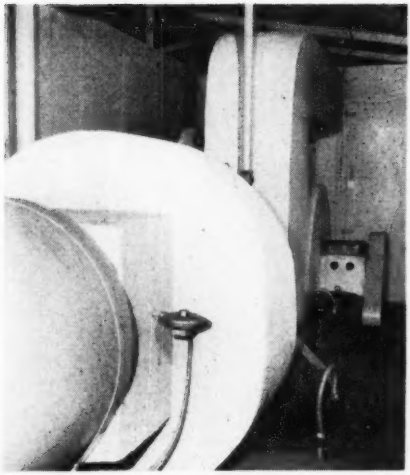


Fig. 2—Interior view of the oven heating equipment room adjacent to the ovens. The layout represents modern engineering design with emphasis on both utility and appearance.

tained with an accompanying increase in operating economy.

The fact that the ovens are located outside the building and on the roof introduces no heating problem or heat loss. They are specially designed and insulated for this type of installation. Each oven is direct gas fired and is designed to utilize effectively the Despatch convection heating principle.

The complete heating equipment for both ovens, including all electrical and safety controls, is housed in a specially constructed, well insulated room built alongside the ovens. This room forms an integral part of the oven structure proper, which represents a functional and attractive rooftop layout.

Finishing Process

The overhead conveyor, upon leaving the loading area, makes a complete left turn and immediately starts upward

Fig. 3—In the center and near the top of this picture, boiler jackets are shown entering and leaving the burn-off oven. The conveyor loading zone is in the right-center background.

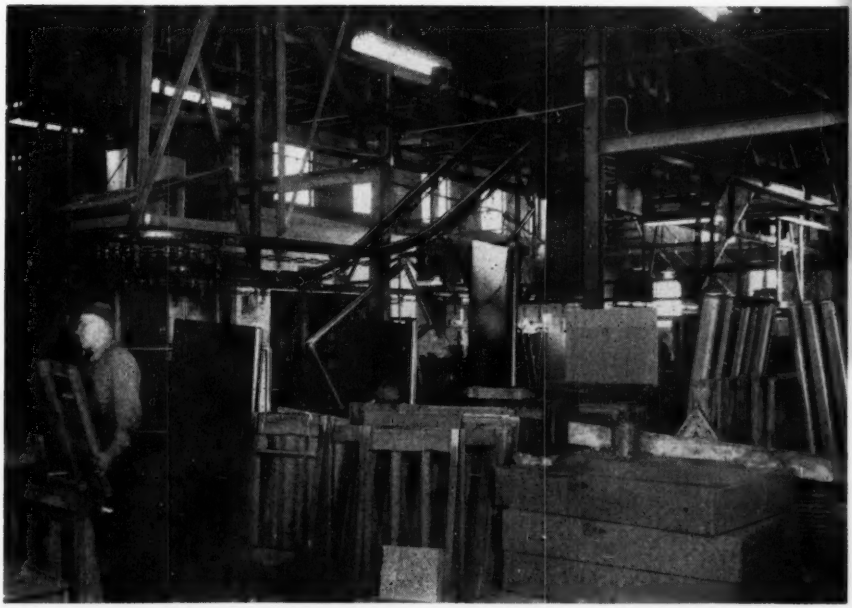
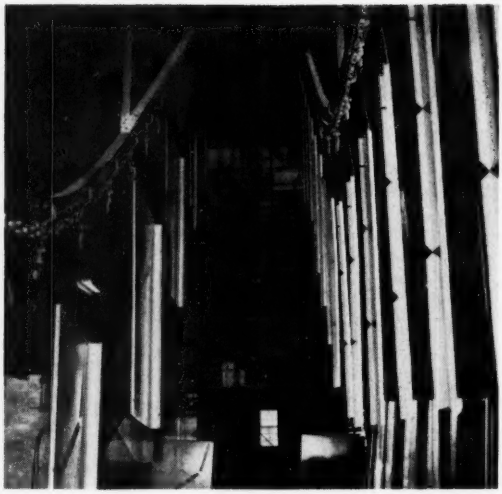


Fig. 5—A close-up of the entry-exit finish bake oven opening. The left side of the conveyor line is moving into the oven while on the right the line is descending and moving into the cooling area.



into the burn-off oven. Here the ware is subjected to a temperature of 600 deg. F. for six minutes. It is interesting to note that the conveyor enters and leaves the oven by way of a single bottom opening (see Fig. 3). This feature of the oven construction forms a natural heat seal, conserving heat and aiding greatly in preventing oven fumes from reaching the plant.

The ware returns to a working floor level on the conveyor, and is given a passing inspection before it enters the paint spray booths. As the ware passes through the first booth, a synthetic coating is sprayed on the inside surfaces. It then continues on through the finish coat booth where the finish coat is sprayed on the outside surfaces (see Fig. 4). Any one of three finishes may be applied, including a hammer finish, wrinkle finish, or plain enamel.

Next, the conveyor carries the freshly painted ware upward for a second time and into the finish bake oven. This oven operates at 350 deg. F. and is slightly longer than the burn-off oven. The trip through finish bake takes eight minutes. The single entry-exit design is also a feature of the finish bake oven (see Fig. 5). Emerging from the finish bake oven, the conveyor drops to ceiling height where for several feet it travels through an open factory area for the purpose of cooling the ware. As it reaches the spacious unloading zone (Fig. 6), it descends to an easily accessible level where the ware is lifted off. As the various furnace and boiler sections are taken from

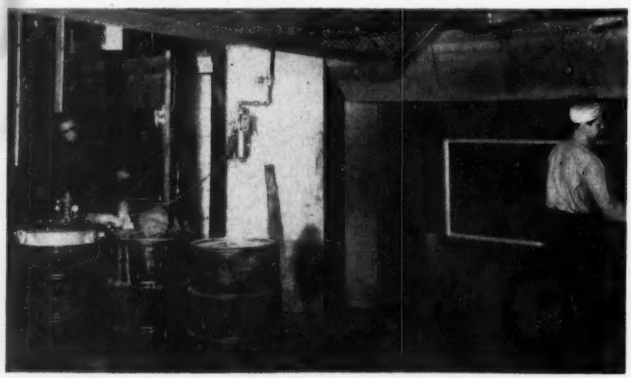
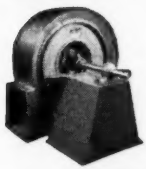
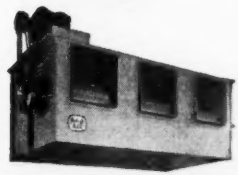


Fig. 4—The conveyor travels from right to left in this picture. The prime coat is applied in the booth on the right; the finish coat in the one to the left.





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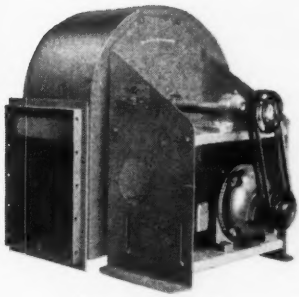

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Fig. 6—The unloading area is large and is strategically located. The various components of a furnace casing or boiler jacket are trucked to an adjacent area where they are packed and shipped flat.

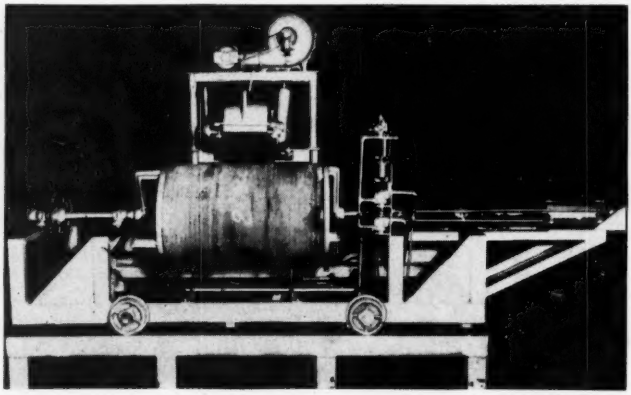
the conveyor, they are sorted and stacked on floor trucks, ready for packing and shipping. The entire Atlas finishing operation stresses practicability and convenience, with no lost motion.

Drum Cleaning Machine Cuts Cleaning Time

A RELATIVELY simple method of dealing with the steel drum cleaning problem at the Columbus Barrel Cooperage Company, in Columbus, Ohio, has cut this company's time for the operation 80 per cent. It has improved on the former method of cleaning drums by hand, employing a brushing wheel mounted on a portable tool.

The machine now being used for this purpose was fabricated in the shop and was built during spare time. It consists of a welded under-frame on which is mounted the drum holding and cleaning apparatus.

The drum, as shown in the accompanying photograph, is held rigid between two circular end pieces by means of compressed air pressure. A chain drive, powered by an electric motor, revolves the drum. The cleaning is performed by Osborn No. 1115 Disc-Center Wire Wheel Brushes containing 0.014



This machine for cleaning steel drums cuts the cleaning time and simplifies the operation considerably. An Osborn Manufacturing Company field engineer suggested the machine and the Columbus concern's shop workers did the rest.
(Photo courtesy The Osborn Mfg. Co., Cleveland, Ohio)

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Ventilated **NON-FRAY BUFFS**

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ROCKLAND MASSACHUSETTS

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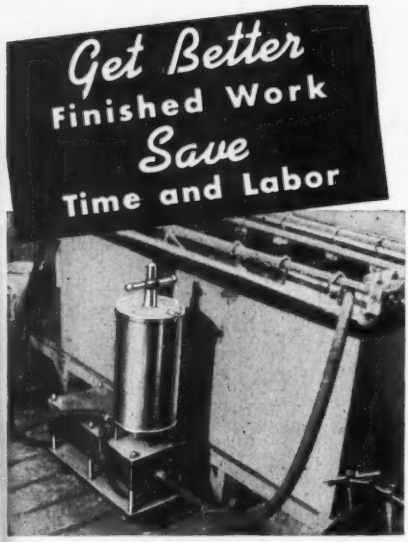

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You'll get better finished plated work, save time and labor and you'll get longer service life from your plating solutions. More and more cost-minded platers depend on Alsop *"Sealed-Disc"* Filters, to remove all dirt, dust and oil-sludge from their solutions and keep their solutions free from even the invisible impurities that cause trouble. Users of *"Sealed-Disc"* Filters save time and labor, they know that their clean work is being put into bright, clean solutions. Regardless of the size or type of your installation, there's a *"Sealed-Disc"* Filter to *"fit your job"*—write for complete information or contact your regular plating supplier.

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605 Keen Street, Milldale, Conn.

ALSOP ENGINEERING CORPORATION
Filters, Filter Discs, Mixers, Pumps, Tanks

wire. The upper framework is moved manually as each section of the drum becomes thoroughly cleaned. A motor-driven suction fan (shown at top) removes the dust and dirt, making the operation comparatively dust-free.

New Machine Applies Rust Preventative Coating

A machine for the application of rust preventative coatings has been announced by the Cincinnati Cleaning and Finishing Machinery Co., Inc., 311 Hecla St., Ironton, Ohio, and Cincinnati, Ohio. Especially designed for the application of Government Specification No. AXS-673 Corrosion Preventative Compound, the machine sprays the compound on parts, then dries the coating before discharging the parts.

The first of these machines has been installed in a Midwest ordnance depot, and is used to rustproof a wide variety of parts before overseas shipment or extended storage. A wire mesh conveyor belt carries the parts through the following operations at speeds variable from 1½ to 3 feet per minute: loading, oil spray, drain, infra-red drying, cooling, and unloading.

Among other features of the machine, the manufacturer lists: explosion-proof switches, motors and wiring, spark-proof pumps, supply tank for rust preventative, belt cleaning tank on return leg of conveyor, adjustable infra-red drying lamp bank, automatic carbon dioxide fire protection, with automatic fire curtains and spark-proof exhaust fan and duct work.

The machine's overall dimensions are: 46 feet long, 8 feet wide and 5 feet 6 inches high. The conveyor belt is 33 inches from floor level and will accommodate parts up to 22 inches high and 48 inches wide.

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TRADE MARK

PALLADIUM PLATING SOLUTION

With the current restrictions in nickel, perhaps palladium will answer your needs.

"PALLITE,"* the original palladium plating solution, has given satisfactory results in plating wave-guides and other electronic equipment, where throwing power and ease of operation are most important.

*PALLITE is the trade name for the patented Palladium solution, proven successful during the difficult years of shortages of nickel and other critical metals.

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PRECIMET LABORATORIES
64 Fulton Street, New York N. Y.

Successful Lubrication Through Baking, Degreasing

IN a large Philadelphia plant with a 700-foot monorail conveyor system, the problem of lasting lubrication through degreasing and drying oven operations defied ordinary petroleum products.

Cans being carried on the rail move through the following sequence of events: degreasing, washing, drying, prime paint coat, drying, final paint coat, final drying. With conventional lubrication the conveyor moved jerkily, due to gum-up of the lubricant at high temperature and its removal at degreasing. Breakage and down time were high.

A switch was made to a colloidal graphite suspension in paint thinner. This microscopically fine solid lubricant is chemically inert and hence impervious to the action of degreaser solvent. It is also unaffected by heat up to 5000 deg. F. in inert atmospheres. Sprayed on the conveyor one day a week (for 1½ hours) through two guns mounted six inches from the edge of the chain, it provided perfect freedom of motion for the system.

MOTORLESS REFRIGERATOR. A motorless, electric refrigerator has been perfected by a British concern. Finished in gleaming porcelain enamel, it cools by means of the heat-absorption principle, utilizing a small electric heating device.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

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of Low Cost
High Efficiency Filtration
with Titeflex

Regardless of what you filter you'll find this booklet of interest. It contains full details of how Titeflex filters can reduce your filtering costs by (1) saving time and (2) saving materials. Shows entire cycle of operation graphically and lists sizes and capacities of various models. If you filter *anything* it will pay you to get this information.

TITEFLEX, INC.
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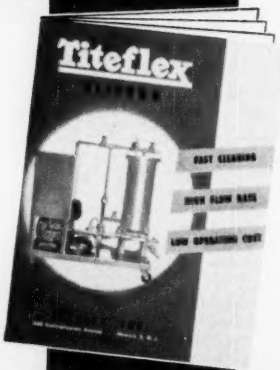

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IF YOU PRODUCE PARTS THAT REQUIRE FINISHING OF ANY KIND

This 22-page booklet is *guaranteed* to open your eyes! It gives you the inside story of advanced barrel finishing *as never told before!*

In the last five years, barrel finishing has made rapid advances. Only those directly connected have been able to keep up. *Only 30%* of the nation's manufacturers are benefiting from the tremendous cost savings and improved finishes made possible by these advances.

Now is the time to investigate this labor-saving, cost-cutting method. ALMCO barrel finishing equipment has completely paid for itself *in as little as two months!* This is easy to understand. A single unit installation replaces from two to twelve men. Savings run as high as 95%.

"Advance Barrel Finishing" is the only mass deburring, grinding and finishing method where results are *controlled*. Amazing results are now possible on almost all types of parts from large castings to small intricate parts. Close tolerance parts can be finished with absolute uniformity to almost any desired micro-inch reading.

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ALMCO Supersheen

AMERICA'S LARGEST MANUFACTURER OF ADVANCED BARREL FINISHING EQUIPMENT — MATERIALS AND COMPOUNDS

ALBERT LEA, MINNESOTA

NEWS of the Industry

NEW PLANTS

Formation of **SEL-REX PRECIOUS METALS, INC.**, 229 Main St., Belleville, N. J., has been announced by Morris M. Messing, president of Bart-Messing Corporation. With increased laboratory and manufacturing facilities, Sel-Rex Precious Metals, Inc. will provide a wide variety of precious metal salts and solutions of gold, rhodium, and silver.

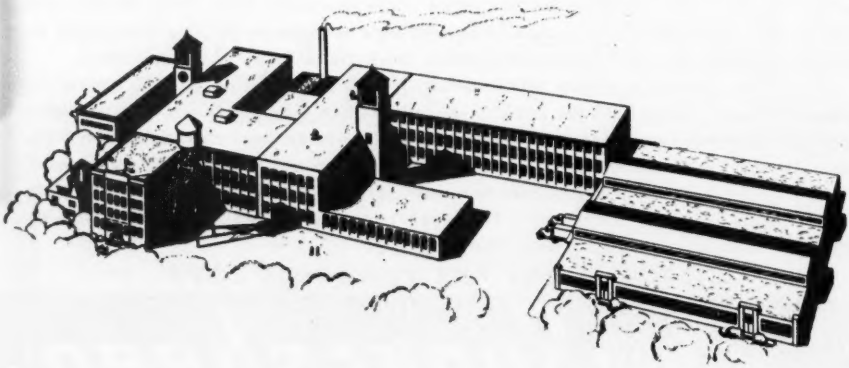
Officers of the company are: M. M. Messing, president; S. G. Bart, secretary-treasurer; and E. C. Rinker, technical director.

A one-story building, now nearing completion, will add 50,000 square feet to the working area in the headquarters of **THE FOXBORO CO.**, Foxboro, Mass., maker of industrial instruments for measurement and control. It is so located as to be a connection, on the same floor level, between the present factory buildings and a new steel and aluminum warehouse, 50 x 200 feet, recently completed.

The building will be used principally for the final assembling and testing of recorders and controllers for temperature, pressure, liquid level, and flow.

AMERICAN-MARIETTA COMPANY has announced an expansion of its West Coast paint manufacturing operations through acquisition of the **INDIA PAINT AND LACQUER COMPANY** of Los Angeles, California, which is now being operated as a wholly-owned subsidiary.

Manufacturer of specialized industrial paints and lacquers, India recently completed the construction of a plant located on a tract of more than five acres in the Lynwood manufacturing district of Los Angeles. The plant includes facilities for the production of varnishes and synthetic resins.



Main office and factory of The Foxboro Company, showing assembly building soon to be occupied

PENNSYLVANIA LACQUER CENTER, 145-147 N. Fourth St., Philadelphia 6, Pa., has announced that on March 6 the company completed 15 years as manufacturer of protective coatings used for lamp finishes, toy finishes, and various other metal products.

The company recently established quarters in a new plant at 131 Berlin Road, Haddonfield, New Jersey, where 15,000 square feet of manufacturing space and 55,000 square feet of storage space were provided.

Laboratory facilities at the new plant will be under the direction of Joseph DiMauro, chemist, and manufacturing will be supervised by Joseph Bongiorno, plant superintendent.

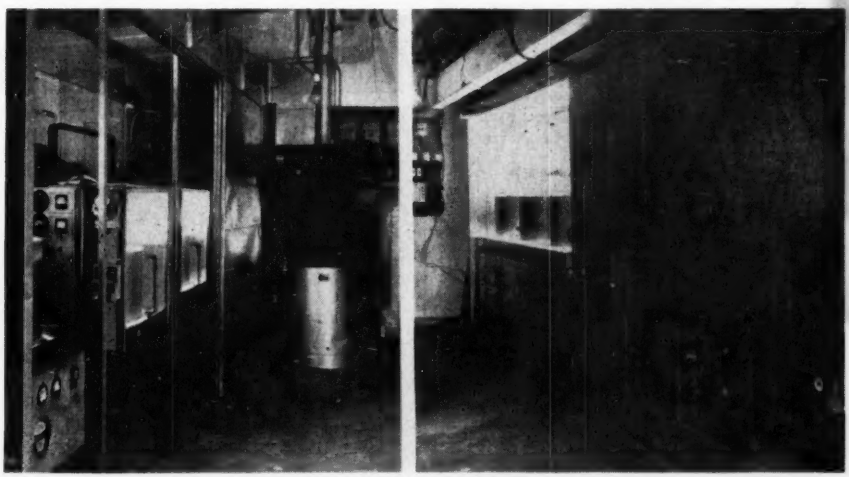
The company also acts as distributor for finishing equipment and accessory supplies.

A special laboratory has recently been designed and constructed by the **BUILDING TECHNOLOGY DIVISION** of the **NATIONAL BUREAU OF STANDARDS.** Developed primarily for studying organic coating materials such as asphalts, tars, and paints, the facilities are sufficiently flexible to meet the requirements of most materials exposed to weathering.

Automatic control of all functions, and of the temperature and purity of the water within narrow limits, assures uniform operation at all times of the Bureau's improved accelerated weathering laboratory. The floor area is divided into a central working space and two areas enclosed in hoods to house the testing machines. In the hood at the right of the illustration are six weathering machines built at the Bureau and based on the enclosed carbon arc as a source of light. The hood on the left encloses four modified commercial weatherometers. The water conditioning equipment is located above the machines on the right, and the air conditioner may be seen in the center background.

ALLIED METAL SPECIALTIES, INC., 516 N. Charles St., Baltimore 1, Md., has begun operations under the direction of R. E. Lee Mowbray, president. Mr. Mowbray was formerly associated with The Cambridge Wire Cloth Co., Cambridge, Md., as manager of the Fabricating Division.

The company designs and fabricates all types of special fixtures from any metal or alloy. Complete facilities are available for the fabrication of plate, sheet, strip, wire, bars, and shapes. Allied Metal Specialties will specialize in equipment designed for high temperature and corrosive applications. Products available in-



Overall view of the National Bureau of Standards' laboratory for accelerated durability testing of exterior coating materials

For more complete information on products and processes use READER SERVICE CARDS inside covers.

clude plating racks, pickling baskets, tote boxes, metal pallets, crates, trays, racks, muffles, retorts, and devices for handling or processing.

COMPANIES

The Electric Products Company has announced that **R. W. BRISKY** is the representative in Grand Rapids, Michigan.

As a member of the Arthur B. Sonneborn Company, Mr. Brisky is well qualified to handle the sale and application of the E. P. line of battery chargers, electrolytic motor-generators, and large motors and generators. Since his graduation from Case Institute of Technology as an electrical engineer, he has spent several years in industrial sales and engineering work.

THE PENNSYLVANIA SALT MANUFACTURING COMPANY has formed a new sales department, the Industrial Chemicals Department, combining the former Heavy Chemicals and Special Chemicals Departments, according to an announcement by William P. Drake, vice president.

The department will be headed by Albert H. Clem, formerly assistant to the vice president in charge of sales. Previous to that assignment Mr. Clem was a field representative and then assistant sales manager of the former Special Chemicals Department. Mr. Clem will report to R. S. Roeller, assistant general sales manager.

District sales managers appointed for the department are: Philadelphia, J. M. Davidson; Paterson, N. J., C. M. McCloskey; Detroit, Donald MacFarlan; Pittsburgh, W. P. Snelsire; Chicago, John C. Hampson; Cincinnati, Donald W. Graham; and Appleton, Wis., C. H. Anderson.

William J. Hennessy, formerly Special Chemicals district sales manager in Pittsburgh, has been appointed sales supervisor for industrial cleaners and has been transferred to the Philadelphia office.

At the same time Mr. Drake announced that George D. Grogan, formerly district sales manager for heavy chemicals in Chicago, has returned to the Philadelphia office to replace Mr. Clem as assistant to the vice president in charge of sales.

Edward M. Wilson, formerly district sales manager for heavy chemicals in the Philadelphia office, was also appointed assistant to the vice president in charge of sales with supervision of all Pennsalt sales to the Government.

Standard of the FINISHING INDUSTRY for 16 years..
DETROIT "HANDY TAC" RAG
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

NEW POSITIONS

DR. JOHN F. THOMPSON, president of The International Nickel Company of Canada, Limited, has been elected to the additional office of chairman of the board of directors, succeeding the late Robert C. Stanley.

DR. PAUL D. MERICA, executive vice president and a director, was elected a member of both the Executive Committee and the Advisory Committee of the company.

Dr. Thompson joined the Company in 1906 as metallurgist. In charge of all research and technical activities on Monel and malleable nickel and head of all field and outside plant operations until 1918, he established and became manager of the first Technical Department, which was a forerunner of International Nickel's present Development and Research Division. Becoming manager of operations in 1921, he supervised the construction and initial operations of the company's Huntington, West Virginia Works,

It LOOKS Like CHROME PLATING

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COSTS LESS
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and requires

NO COPPER
NO NICKEL
NO CHROME

It also protects "SCANT CHROME PLATING"

Strathmore Clear Chrome and Metal Coatings, applied over "bright zinc" metal-finishing processes, give a faithful simulation of fine chrome plating, yet require no copper, nickel or chrome. They are extremely resistant to abrasion, impact, corrosion and discoloration. Samples have withstood more than 200 hours of 20% salt spray without visible breakdown — performance far exceeding specifications for chrome plating. Usually no new equipment is required for this process—merely a change of chemicals in your existing plating tanks. By varying the chemical treatment and buffing technique, brass platings and satin chrome can also be simulated.

Strathmore Clear Chrome and Metal Coatings also greatly increase the durability of "scant" plating – chrome over copper without nickel, chrome over zinc die castings, etc.

Baquik Clear Chrome and Metal Coating No. X-2534

Baking type, can be dipped or sprayed. Baking range 250 F. for 1 hour to 300 F. for 15-20 minutes.

Metalbond Clear Air Drying Chrome & Metal Coating No. SL-300

Air-drying type, can be dipped or sprayed. Dries almost as fast as lacquer.

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Strathmore Products, Inc.

1970 W. FAYETTE ST. Phone 4-2118 SYRACUSE 4, N. Y.

GOOD NEWS

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The Time Saving Composition

Purico Pur-Bur, a new, self-lubricating compound, saves valuable production hours by swiftly removing burrs, surface cracks, gouges, etc., while still giving very close, accurate finishes.

Minute flaws can be disastrous to parts fabricated on a mass production scale. Don't take unnecessary chances. Insist on PUR-BUR for quick, safe, economical removal of surface cracks and gouges before they can elongate and endanger life and material.

PUR-BUR, while acting as a lubricant, also protects the abrasive—lasts longer, is more economical than an ordinary polishing wheel.

PUR-BUR is available in cake and tube form.

Write today for complete information and usage of PUR-BUR.

THE PURITAN MFG. CO.
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founded for the production of non-ferrous alloys. In February, 1949, Dr. Thompson succeeded Mr. Stanley as president.

For his distinguished engineering achievements, Dr. Thompson was awarded the Thomas Egleston Medal of the Columbia University Engineering School's Alumni Association in 1944. In June 1950 he was presented by General Dwight D. Eisenhower with an honorary degree of Doctor of Science, at Columbia University.

Dr. Merica has been executive vice president since February 1949. He first became associated with the company in 1919, becoming director of research and subsequently associate manager of the Development and Research Department. In addition to his responsibilities as executive vice president, he has continued to give special attention to the company's research activities in Canada, the United Kingdom, and the United States. He has evolved numerous iron-nickel and copper-nickel alloys and is the author of many technical papers and articles.

Among the awards Dr. Merica has received for his contributions in the field of metallurgy and outstanding leadership in physical metallurgy has been the John Fritz Medal, which was presented to him in 1938.

ROBERT D. LAWSON has become sales manager of Norton Company's grinding machine division, according to an announcement by Frank W. Smith, vice president. Chicago district manager for the division since 1946, he replaces C.

Robert D. Lawson (left), Wilfred R. Ogg

Denson Day, who has resigned to accept the vice presidency of Machinery Associ-

For simulated chrome finishes—

MD 769 ALUMINUM PASTE

—provides maximum brilliance and metallic lustre

Complete line of MD ALUMINUM PIGMENTS & POWDERS to meet a wide range of Industrial Finishing applications.

MD 769 is a special extra fine lining pigment yielding films of the *highest chrome-like appearance* possible to obtain with a metal pigment.

MD 769 provides a degree of *improved dispersibility* unobtainable in other similar materials. Mixtures made with it are practically free of agglomerated particles. With its use, the utmost in smoothness and leveling are obtained.

MD 769 is particularly recommended for *simulated chrome finishes* for automotive use. It provides a good substitute for chromium plating.

It will pay you to investigate the advantages of MD 769 ALUMINUM PASTE as applied to your industrial finish problem. *Send today* for sample and full information.

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Sales Offices: Chicago, Ill., Cleveland, Ohio
Plants: Elizabeth, N. J., Manchester, N. H., Berkeley, Calif., Emeryville, Calif.

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GOLD BRONZE POWDERS

ates, Inc. of Philadelphia.

WILFRED R. OGG, former New England sales representative for Norton grinding machines, has taken over the Chicago district managership.

LOUIS J. CAMARRA of the Foreign Division has been assigned to handle the northern New England territory.

Mr. Lawson joined the engineering department of Norton in 1918 and worked in various phases of machine sales until his appointment as Chicago district manager five years ago. Mr. Ogg joined the company following graduation from Dartmouth in 1935. Mr. Camarra has been associated with the company's Foreign Division since 1946, including a year spent as sales representative in South America.

A luncheon honoring **GEORGE J. D'AIELLO** and **WILLIAM M. VELLA**, salesmen in the Metropolitan area for The Egyptian Lacquer Manufacturing Co., Newark, N. J., was given at the New York Athletic Club by Philip H. Beach, general sales manager.

At the luncheon both gentlemen were presented inscribed watches, to commemorate their 25th anniversary, by L .A. Ruckgaber, chairman of the board. A congratulatory telegram from O. J. S. deBrun, president, was received and read.

The luncheon was attended by several executives and associates of Mr. D'Aiello and Mr. Vella, both of whom started with the company as office boys and have worked up through the organization to field sales.

William M. Vella (left), George J. D'Aiello

OPPORTUNITY

FOR INDUSTRIAL FINISHES SALES ENGINEERS

Leading manufacturer with highest financial rating, whose sales have jumped 100% in the last year, is expanding. Experienced sales engineers are needed to fill choice territories in Metropolitan New York, New England, Philadelphia, and the Mid-West. This is a live opportunity for engineers with experience in industrial sales of organic product finishes, especially clear coatings for copper, brass, nickel, chromium, and zinc.

Send resumé of education, business experience, present employment, and salary requirements. All inquiries held in strictest confidence. Our men know about these openings. Box 51, Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

HORACE H. HOPKINS, assistant general manager of the Fabrics and Finishes Department of the Du Pont Company, has been appointed an assistant to the treasurer of the company. Named to succeed him is **DAVID H. DAWSON**, assistant general manager of the Pigments Department. **JOSEPH SHRAWDER, JR.**, assistant sales director of the Pigments Department, succeeds Dr. Dawson.

Dr. Hopkins has been assistant general manager of the Fabrics and Finishes Department since 1947, following many years of chemical research work within the company. He joined Du Pont in 1924 as a chemist at the Experimental Station at Wilmington and went into the Finishes Division in 1927. He became assistant to the chemical director of the department in 1939, director of the Philadelphia laboratory in 1943, and manager of the Finishes Division in Wilmington in 1945.

Dr. Dawson has been in research, sales, and management work with the Pigments Department since he joined Du Pont in 1933 as a chemist. He advanced in the laboratories at the Baltimore and Newark, New Jersey plants until 1940, when he became a supervisor in the research and technical service divisions at the pigments laboratory, Newport, Delaware. In 1946 he was appointed director of sales for the Pigments Department, and in 1948 was promoted to assistant general man-

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INDUSTRIAL WASHING MACHINE

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No matter what your product, the Industrial Washing Machine Corp. makes equipment for processing it—washing, rinsing, slushing, drying, treating with Bonderite, phosphatizing or any combination of these operations.

An INDUSTRIAL machine operates with precision efficiency, provides volume production, saves labor, time and money. What's more, every INDUSTRIAL machine is especially designed and compactly constructed to conserve vital floor space.

Find out TODAY how we can help you with your specific problem.

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New Brunswick, New Jersey

Specialists in cleaning equipment design and manufacture.

CERTIFIED TO MEET
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Lacquers

If your defense production contracts require lacquers, use the finish certified for this purpose — NCP LACQUERS. Take advantage of our engineering experience and extensive know-how with government specifications to solve your finishing problems quickly and economically. Write, wire or phone today.

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ager of the department.

Dr. Shrawder joined Du Pont in 1934 as a chemist at the Newport plant and advanced through research and sales work in the Pigments Department. In 1947 he was promoted to manager of West Coast sales and in 1948 became manager of technical sales for the department in Wilmington. He was appointed assistant sales director in 1949.

ERNEST R. MUELLER has been appointed supervisor of organic coatings research at Battelle Institute, Columbus, Ohio. In his new capacity, Mr. Mueller will be in charge of Battelle fundamental and applied research on paints, varnishes, and lacquers. Much of this work is concerned with the development of special - purpose coatings and with the development and evaluation of raw materials for coatings.

Ernest R. Mueller

Mr. Mueller has been associated with the Battelle staff since 1945. He holds a Bachelor of Science degree from Michigan State College and a Master of Science degree from Purdue University. Before joining the Battelle staff, he was a research chemist with the Ditzler Color Division of the Pittsburgh Plate Glass Company for nine years.

The author of papers and articles on organic coatings, Mr. Mueller is a member of the American Chemical Society and Association of Analytical Chemists.

Jervis B. Webb Company of California, 2650 E. Washington Boulevard, Los Angeles (subsidiary of Jervis B. Webb Company of Detroit, manufacturer of conveyors), has announced the appointment of **ERIC O. MELMER** as secretary and chief engineer.

Associated with the conveyor business for over 20 years as designer, chief draftsman, and chief engineer, Mr. Melmer is an outstanding inventor of several of the most widely used improvements in the materials handling industry.

DIAPHRAGM*

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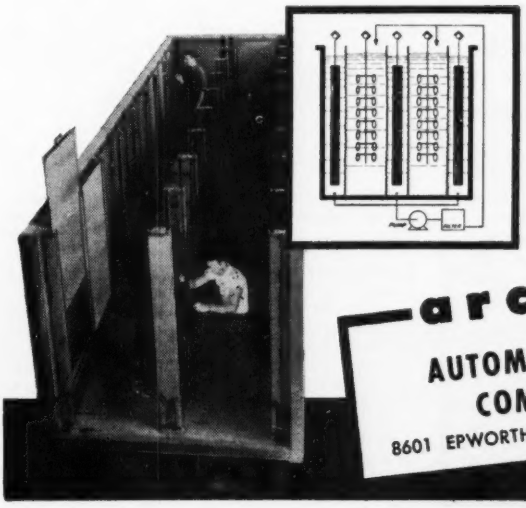
PLATING SOLUTIONS

FOR ● *QUALITY* ● *UNIFORMITY*
● *SMOOTHNESS* ● *ECONOMY*

Diaphragming is the advanced plating process that segregates the anolite from the catholite by means of a canvas screen between the anode and cathode compartments and provides for filtering insoluble particles from the plating solution.



'Phone or write us requesting a consultation with one of our Diaphragm engineers. They can advise you concerning new equipment or the possibility of converting your present equipment. These men have led the industry in making the Diaphragming principle practical and available. No obligation.

A booklet which comprehensibly discusses Diaphragming is available on request.

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AUTOMOTIVE RUBBER COMPANY, INC.

8601 EPWORTH BLVD. • DETROIT 4, MICH.

By vote of the directors of The Exolon Co., Tonawanda, N. Y., manufacturer of silicon carbide and aluminum oxide,

Dell M. Ramsey (left), Samuel F. Walton

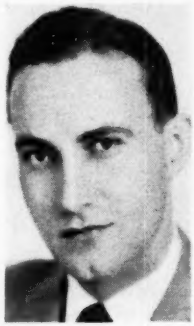
DELL M. RAMSEY, works manager of the Tonawanda plant, and **SAMUEL F. WALTON**, technical director, were recently elected vice presidents of the company.

HOLLAND SAYS:
DEBURRING WILL CUT GRINDING COSTS
Motor Driven Tilting Tumbling Barrels for cleaning, polishing, grinding, deburring, sanding, burnishing and various other applications.
Wide selection of metal finishing equipment on hand. Write for FREE folder "M."
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N.Y.

GORDON F. COLSON has been appointed field engineer for the abrasive division of Norton Company, manufacturer of abrasives and grinding machines. He will be located in the Chicago area.

Until the time of his recent appointment, Mr. Colson was a grinding engineer in the sales engineering department of the company's main offices at Worcester, Massachusetts.

Appointment of **EDWIN VEREEKE** to the position of sales manager, in charge of all sales and advertising, has been announced by the Heil Process Equipment Corporation, Cleveland, manufacturer of chemical-resistant tanks and linings, tank heaters, anodes, and related products. Mr. Vereeke has been with Heil in the capacity of district sales supervisor.



Edwin Vereeke

Also announced are the appointments of **ROBERT PETERS** as sales engineer for the area west of Cleveland, and **KEN GRADER** as sales engineer in charge of the area east of Cleveland. Mr. Peters was previously an estimating engineer for Heil. Mr. Grader, formerly of Philadelphia, will make his headquarters in Cleveland.

The appointment of an additional technical sales representative for the West Coast and the assignment of a new sales representative to the Chicago office were announced recently by Hercules Powder Company's Synthetics Department.

B. J. DOUGHERTY has been assigned to Hercules' Los Angeles office, where he will assist the West Coast sales manager for the Synthetics Department. **NORMAN D. GREEN** has been named to succeed Mr. Dougherty in the Chicago office.

Mr. Dougherty joined Hercules in 1938, and for the past three years he has been representing the Synthetics Department in the Chicago area.

Mr. Green joined Hercules in 1940, and

Replace scarce plating metals with

JOHNSON'S CORROSION INHIBITING METAL WAXES

Hard dry protective finishes for

BRASS
COPPER
ALUMINUM
UNTREATED STEEL
PHOSPHATED STEEL
BLACK OXIDIZED STEEL
ALL METAL SURFACES

Easily applied by dip, spray, wipe, flow, roller coat

After 128 hours in the humidity cabinet, this wrench shows no surface deterioration where coated with Johnson's Metal Wax . . . and the protected part looks cleaner and brighter.

Shortages of electroplating metals as well as finishes, lacquers and enamels are bound to become an ever-increasing problem. And the answer is—Johnson's Corrosion Inhibiting Metal Waxes!

They offer excellent protection for black oxidized, phosphated, Bonderized, Parkerized, painted or untreated metal surfaces...because they provide an unbroken film that keeps out moisture. Available in clear or black, they dry to a hard, tack-free, lustrous finish that is uniform, durable and flexible.

For complete information write to:

S. C. JOHNSON & SON, INC.
Industrial Products Department
Racine, Wisconsin

has been a member of the Synthetics Department's order division in the Wilmington office for the past three years.

George R. Woleben

Recently appointed to handle sales and service work for the Metal Cleaner Department of Cowles Chemical Company in New York State was **GEORGE R. WOLEBEN.**

A graduate of Fredonia State Normal School, Mr. Woleben also received additional instruction in the Research Laboratories of Leeds & Northrup Company, Germantown, Pennsylvania. Before joining Cowles, he was employed as a metallurgical microscopist in a supervisory capacity controlling quality of steel in process at Allegheny Ludlum Steel Corporation, Dunkirk, New York.

J. W. Stuart

The appointment of **J. W. STUART** as Eastern territory Machine Division sales representative has been announced by The Osborn Manufacturing Company, Cleveland, Ohio.

Mr. Stuart has been associated with the foundry industry since 1933. He was formerly foundry manager of the Products Machine and Foundry Company in Bridgeport, Connecticut. Prior to that time he was foundry engineer at the Farrel Birmingham Company at Ansonia, Connecticut.

E. F. Houghton & Co., Philadelphia 33, Pa., has announced the appointment of **CARLOS H. MERCADO** as manager of the Foreign Sales Department, succeeding L. J. Norris who has retired.

Mr. Mercado was formerly export manager and treasurer of Mercher Trading Corporation, New York. Born in the Dominican Republic, he was educated at Temple University, Philadelphia, and City College of New York.

Also announced was the election of **WILLIAM F. MacDONALD** as president of E. F. Houghton & Company of Canada Limited, Toronto, Ontario, Canada, to succeed the late G. W. Pressell.

Mr. E. H. MacInnis will continue as vice president and sales manager in the Toronto headquarters, 100 Symes Street.

R. W. Schwartz

R. W. SCHWARTZ, sales and service engineer for the Production Machine Company, has been transferred from the home office in Greenfield, Massachusetts, to central Ohio. His territory will include the State of Ohio, western New York and Pennsylvania, and northern sections of Kentucky and West Virginia.

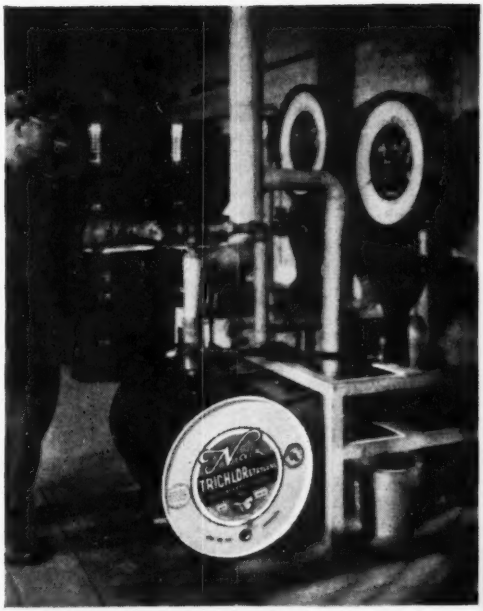
Mr. Schwartz has been active in the company's experimental and sample finishing laboratory for the past several years, and has acquired a diversified background.

Jacob W. Vreeland

Wagner Brothers, Incorporated, Detroit, manufacturer of copper, tin, zinc, cadmium, and nickel anodes, electroplating rectifiers, and buffing equipment, has appointed **JACOB W. VREELAND** chief metallurgist of the electroplating anode division.

Mr. Vreeland is well known to the plating industry through his previous association in similar chemical and metallurgical capacities.

metal parts come clean with



NIALK TRICHLORethylene

The cleaner the part, the better the finish . . . one good reason why metal finishers specify NIALK* TRICHLORethylene, the metal-cleaning and degreasing agent of highest quality and stability.

A PAMPHLET containing information on the properties of NIALK TRICHLORethylene is available on request. Just send in the coupon below. *Trade-Mark

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NIALK TRICHLORethylene
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Gentlemen: Please send me a copy of your pamphlet on NIALK TRICHLORethylene.

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Firm_____
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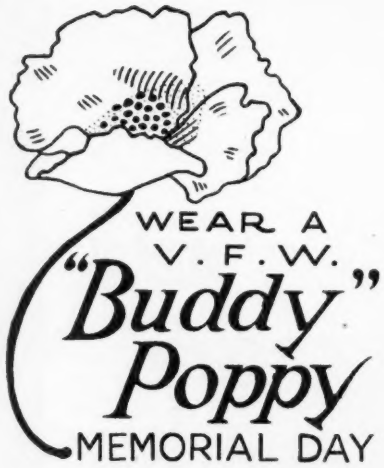
Harold Manderscheid

The Manderscheid Company has announced the addition of **HAROLD MANDERSCHEID** to its sales force.

Mr. Manderscheid joined the company in 1946 following service with the Air Force. He has been serving in various capacities with the company, and recently completed a refresher course with various suppliers bringing him up to date on applications of their products. He will confine most of his efforts to the Chicago area.

CORRECTION. On page 88 of the March 1951 issue of PRODUCTS FINISHING in the news item regarding the appointment of Clyde Kelly as assistant to the president of B. Mercil & Sons Plating Company, the statement was made that Mr. Kelly was a former vice president of Driscoll and Company. The statement should have read that Mr. Kelly was formerly assistant to the president of Driscoll and Company.



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Supplied in brass, steel or nickel silver wire in sizes .0025 - .006 or bristle, Nylon or fibre.

Special sizes and shapes to order.

Write us (dep't. P) for catalog and price list.

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SOCIETIES

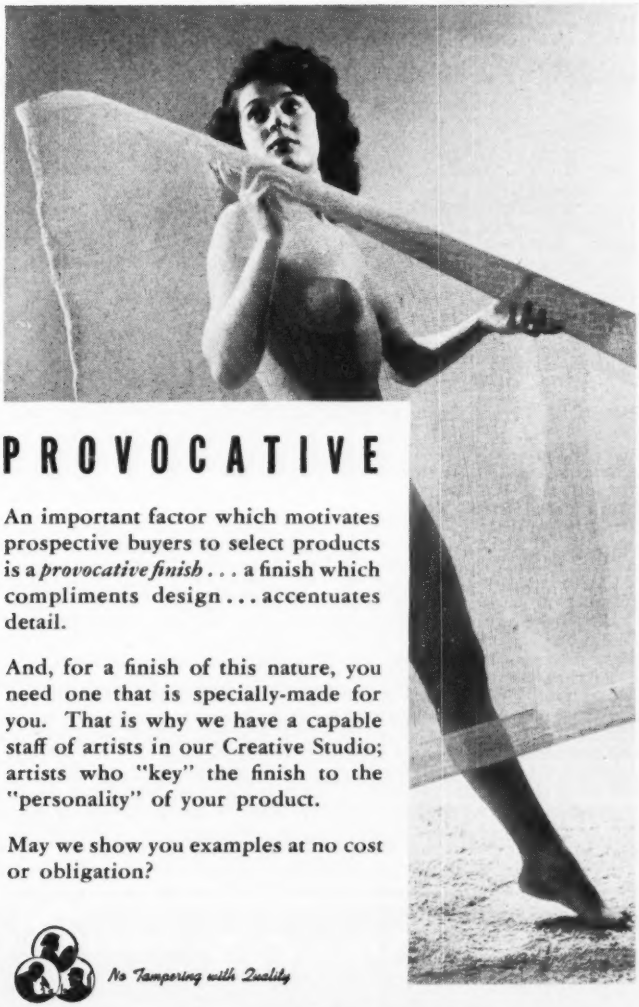
THE ELECTROCHEMICAL SOCIETY, during its National Spring Meeting held recently, announced the establishment of The Palladium Medal of the Electrochemical Society, to be awarded for original and outstanding contributions to the knowledge of corrosion control.

The Medal will be awarded biennially to a medallist selected by a committee composed of scientists prominent in the fields of corrosion and electrochemistry. The award will be open to anyone.

The medallist will be invited to address the National Fall Meeting of the Electrochemical Society at which the Medal will be presented. The first presentation will be made this year.

The Medal itself will have some interesting features of design and will be struck in palladium.

The **CHICAGO ELECTROPLATERS INSTITUTE,** 35 E. Wacker Dr., Chicago 1, Ill., a member unit of the **NATIONAL ASSOCIATION OF METAL FINISHERS,** has issued a report entitled "**THE**



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And, for a finish of this nature, you need one that is specially-made for you. That is why we have a capable staff of artists in our Creative Studio; artists who "key" the finish to the "personality" of your product.

May we show you examples at no cost or obligation?

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Manufacturers of Protective and Decorative Coatings

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Roller Coating Specialists

PLATING INDUSTRY IS READY." This report lists the combined facilities of the job plating companies who are members of the Institute so that Government procurement agencies, prime and sub-contractors, and other interested parties may be informed about the potential contribution which can be made by these metal finishers in the total defense production effort.

According to the Institute report, the employees in member plants may be increased to 3,787 (based on existing facilities). The plating solutions in use total 680,000 gallons; the current supply available (at 6 or 12 volts) totals 1,500,000 amperes. Principal plating solutions presently in tanks are listed as follows:

Cadmium	51,281	gallons
Copper	58,881	"
Zinc	72,835	"
Nickel	155,733	"
Chrome	63,894	"
Silver	4,021	"
Brass	10,741	"
Others	1,697	"
(Tin, Hot Dip	21,764	lb.)

Floor space available is 1,107,689 square feet; 289 polishing machines and 2100 plating tanks are installed and available for use. The dollar value of buildings and equipment reported by this group of finishers is $16,014,400.

The Chicago Electroplaters Institute points out that the finishing industry is specially equipped to preserve and protect articles fabricated from metals. Plating forms lubricant surfaces for high speed bearings, provides heat treat protection, and deters rust and corrosion. The facilities of member companies of the Institute are extremely flexible and can be speedily and efficiently converted to meet specifications on defense production.

All types of metal finishes normally employed, in addition to a wide variety of special finishes, can be produced in the plants of the members of the Chicago Electroplaters Institute — an important segment of plating industry activity in the Midwest.

As a result of the annual election, **RALPH M. HUNTER** and **MARVIN J. UDY** will be the new president and vice president, respectively, of **THE ELECTROCHEMICAL SOCIETY.**

Dr. Hunter, manager of the Electrochemical Division of The Dow Chemical Co., Midland, Mich., replaces Dr. Charles L. Faust of the Battelle Memorial Institute, Columbus, Ohio. As past president, Dr. Faust will continue to serve as a member of the board of directors.

Other vice presidents, elected during the past two years and who will serve with Mr. Udy, are J. C. Warner, president of the Carnegie Institute of Technology, Pittsburgh, and R. J. McKay of the International Nickel Co., New York City. Dr. Henry B. Linford of Columbia University, New York City, and E. G. Widell, Radio Corporation of America, Harrison, N. J., will continue as secretary and treasurer, respectively.

The **DETROIT BRANCH, AMERICAN ELECTROPLATERS' SOCIETY,** will hold a special meeting at 8 p.m. Friday, May 18, in the Statler Hotel, Detroit.

Special guests of the Branch on that occasion will be Dr. S. Wernick, secretary of the Electrodepositers Technical Society London, England, and Dr. William Blum of the National Bureau of Standards. Dr. Wernick, acting in his official capacity, will present an honorary membership in the Electrodepositers Technical Society to Dr. Blum.

Dr. Wernick will speak on a review of British metal finishing practices, and W. M. Phillips, General Motors Corporation, will discuss a review of American metal finishing practices.

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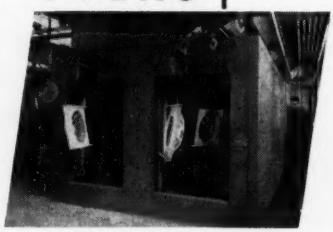

YOUNG BROTHERS CO.

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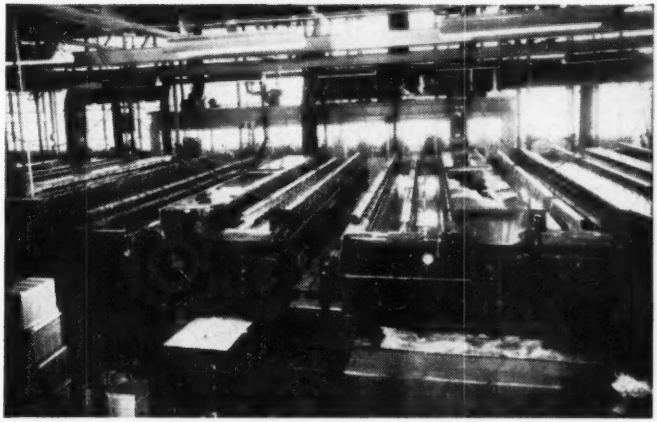
This Program Gives You
PERMANENT PROTECTION *Against Corrosion*
During METAL FINISHING!



To help you *permanently* control corrosion of equipment used for metal finishing, Haveg Corporation offers you this 2-point program:

1. Personal cooperation in the engineering and installation of Haveg tanks and other equipment
2. Complete manufacturing facilities to mold Haveg equipment to fit your individual needs

This means a *permanent* solution to your corrosion problems during metal finishing. That's because molded plastic Haveg is resistant throughout its entire mass to practically all solutions used for finishing metals. Moreover, you have equipment virtually tailor-made for longer service life, improved production. Many standard shapes available—including tanks, piping, fittings, valves, etc. Write for new Haveg Engineering Bulletin F-6.

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The **METAL FINISHING INDUSTRY ACTION COMMITTEE** of the **OHIO RIVER VALLEY WATER SANITATION COMMISSION** points out to platers (in a recent news release) how much just one tank of plating solution will contaminate a stream into which the solution may be dumped.

The Committee cites an example of a tank containing 100 gallons of cyanide solution, the strength of which is 5 ounces of cyanide per gallon. If this tank of cyanide solution was dumped into a stream in which the permissible limit for cyanide is 0.10 parts per million, then 37,500,000 gallons of water would be required to dilute the solution to the desired concentration of 1.10 p.p.m. This is enough water to cover a football field to a depth of 105 feet.

Members of the Metal Finishing Industry Action Committee actively engaged in working with the finishing industry to prevent undesirable stream pollution are as follows: W. L. Pinner, Houdaille-Hershey Corp.; W. H. Toller, Jr., Houdaille-Hershey Corp.; R. G. Chollar, National Cash Register Co.; L. J. Hibbert, National Cash Register Co.; Hubert S. Kline, Frigidaire Div., GMC; David Milne, General Motors Corp.; C. C. Cupps, Standard Steel Spring Co.; Walter Miller, Hamilton Manufacturing Corp.; H. Farber, Westinghouse Electric Corp.; C. L. Prichard, Arvin Industries, Inc.; Garland A. Logsdon, American Radiator & Standard Sanitary Corp.; Harry W. McElhaney, Talon, Inc.; Allen M. Reed, The Electric Auto-Lite Co.; K. S. Watson, General Electric Corp.; William J. Neill, Columbus Metal Products, Inc.; R. M. Drews, Republic Steel Corp.; Edward J. Cleary, John C. Bumstead, and John E. Kinney, all of the Ohio River Valley Water Sanitation Commission.

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PRESCRIPTION FINISHES
Compounded especially for
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Give us your finishing problem.
We guarantee you an answer
based on your conditions, and
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meetings

OF INTEREST TO FINISHERS

May 21-22. Thirty-Third Annual Meeting, American Zinc Institute, Hotel Statler, St. Louis, Missouri.

May 23-24. Fifth National Convention, The American Society for Quality Control, Inc., Public Auditorium, Cleveland, Ohio.

May 25-26. Spring Advisory Meeting, Federation of Paint & Varnish Production Clubs, Book-Cadillac Hotel, Detroit, Michigan.

June 4-6. Nineteenth Annual Convention and Exhibit, Institute of Cooking and Heating Appliance Manufacturers, Netherland Plaza Hotel, Cincinnati, Ohio.

June 18-22. Annual Meeting, American Society for Testing Materials, Atlantic City, New Jersey.

July 30-Aug. 2. 38th Annual Convention, American Electroplaters' Society, Statler Hotel, Buffalo, New York.

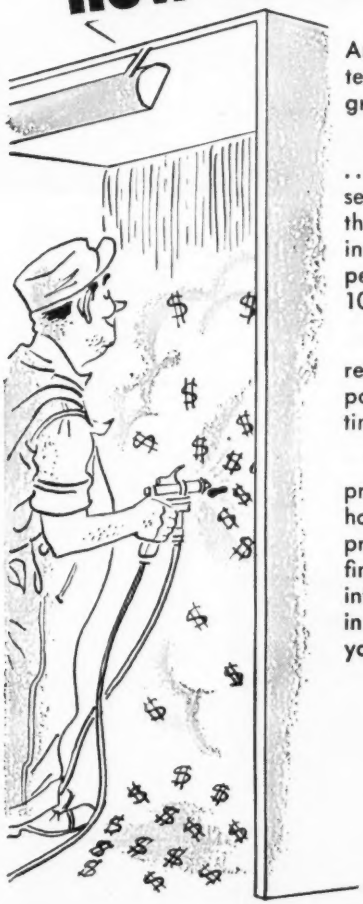
Sept. 3-7. Diamond Jubilee Meeting, American Chemical Society, New York, New York.

Sept. 10-14. Sixth National Instrument Conference and Exhibit, Instrument Society of America, San Houston Coliseum, Houston, Texas.

Oct. 29-31. 63rd Annual Convention, National Paint, Varnish and Lacquer Association, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

Nov. 1-3. 29th Annual Meeting, Federation of Paint and Varnish Production Clubs, Chalfonte-Haddon Hall, Atlantic City, New Jersey.

how to reduce a waste!



Are you ignoring the waste commonly encountered in spray painting? BEDE PAINT HEATERS greatly reduce this waste — and here's why.

Heating the paint greatly reduces its viscosity . . . requiring much less air for atomization. Consequently fewer paint particles are blown into the spray booth, and much less paint is wasted in overspray. Users report increases in coverage per gallon of finishing material ranging from 10 to 30% and more.

In addition, less solvent is used, since heat replaces thinner. Decided labor savings are possible because less spraying and handling time is needed.

Want more facts on how the hot spray process can bring you additional benefits? On how BEDE PAINT HEATERS can increase your production — and maintain the highest quality finish? Just write us. We'll give you *complete* information. Demonstrations can be arranged in all principal cities with no obligation on your part.

WRITE TODAY for free 8-page Bulletin and Articles giving complete information about hot spray.

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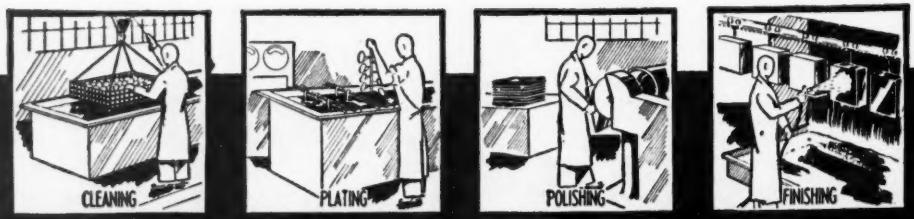
JOBBERS

A few choice sales territories are still open. Write, giving full details of your organization.



New • EQUIPMENT • MATERIALS • PROCESSES

Hydraulic Loader-Unloader

A conveying machine to be used in connection with a Udylite Junior Full Automatic Plating Machine has been developed by The Udylite Corp., Detroit 11, Mich. In the accompanying photograph (Fig. 1), which shows the Automatic Loader-Unloader and chain conveyor, the white boards represent plating racks that would be used in actual operation. Figure 2 shows how the Loader-Unloader may be used in connection with an automatic plating cycle.

The Full Automatic is powered by a 3 h.p. Vickers Hydraulic Pump and controlled by solenoid valves supplying oil to the two hydraulic drive cylinders. One of these cylinders supplies power for the lift and the other for the transfer motion. The Udylite automatic loading and unloading mechanism is also powered with a 3 h.p. Vickers Hydraulic Pump driving a hydraulic cylinder through Vickers solenoid valves, controlled by limit switches on the full automatic and single-row conveyor.

The operation of the Loader is very simple. When a work carrier or plating rack is deposited on the conveyor rail segment connected to the loading mechanism, a solenoid is energized and the hydraulic cylinder pushes the rail segment to a matching position in the rail of the chain conveyor. This conveyor is then started by a limit switch actuated by the loader at the end of its travel, and the conveyor chain moves ahead one station, which carries the rack of plated parts onto the conveyor rail and moves a rack of unplated parts onto the loader rail segment. The Loader then returns to

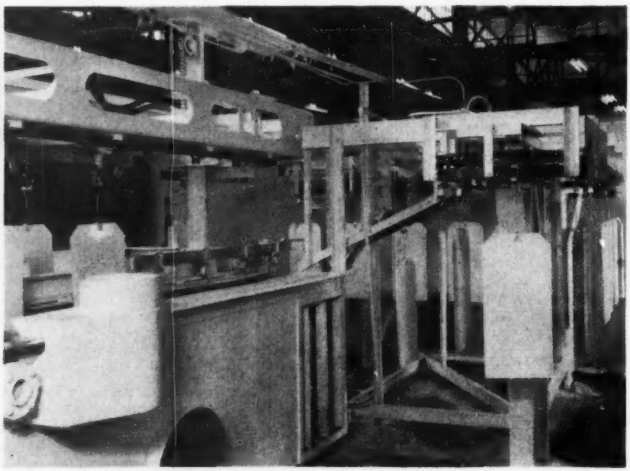


Fig. 1—Udylite Automatic Loader-Unloader and Chain Conveyor

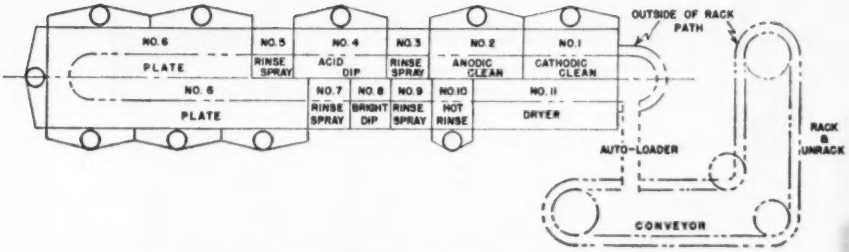


Fig. 2—Plan layout showing Loader-Unloader in plating cycle

the original position with the rack of unplated parts ready to move into the plating machine with the next movement of the Full Automatic.

The company recommends its Automatic Single-Row Loader-Unloader and conveyor not only for its labor-saving features, but also because for the first time the size of rack used in a full automatic is not limited to the length and strength of an operator's arm. Much heavier racks can be handled, which means the racks can have a larger copper cross section and much heavier insulation, thus carrying many more parts efficiently.

Another feature cited by the manufacturer is the life of the rack. Since the rack does not leave the conveyor and does not touch the floor or adjacent racks, the insulation will last much longer. Many racks are responsible for solution contamination where the insulation has been punctured by rubbing the ends on the floor and by bumping other racks when stacked together. When solutions creep in between the insulation and the metal of the rack, they are transferred from one bath to another, and the resulting contamination is often a very troublesome source of poor plating, which is very difficult to trace.

Of course, a long rack is desirable from a space standpoint because if it is possible to make the rack long and the tank deep, the tank length can be less and the overall floor space reduced.

The Automatic Single-Row Loader and conveyor also conveys the racks to and from any selected area away from the heat and fumes of the plating machine. Combined with the Full Automatic Plater, it is said to offer an ideal solution to the expected labor shortage. The equipment requires less manual handling of parts, and when such handling is necessary, it can be done under much better working conditions without the need of expensive and cumbersome rubber boots, gloves, aprons, and so on, and usually with unskilled labor.

With the single-row conveyor, the supervisor can check the rate of production at any time as the racks to and from the machine are in full view, and an unloaded or partially loaded rack is easily detected. The unit can also transport racks past an inspection station where the quality of the work can be quickly and easily checked and, when necessary, adjustments can be made immediately before a number of parts are rejected.

Another advantage of the Udylite Loader-Unloader and conveyor is that certain portions of the actual plating cycle, such as spray washes, spray rinses, drying, and so on, may be removed from the plating machine and placed on the chain conveyor.

Tuch Masking Tape

Technical Tape Corp., 177th St. and Harlem River, New York 53, N. Y., has developed Tuch Masking Tape.

Possessing unusual strength and durability, the manufacturer also claims the following advantages for Tuch Tape: it adheres properly, holds down well through all processing, and comes off easily and cleanly; it will turn on a dime without breaking or cracking, and will hold tightly in all positions; it strips in long, clean strokes regardless of temperature, humidity, rain, or other atmospheric conditions. Also, it never stains even white finishes, nor will it stain in baking.

Almco Improved DBO-1 Finishing Barrel

An outstanding feature of the Almco Supersheen Finishing Barrel Model DBO-1 is the removable screening drawers which facilitate separating parts from

EVERYTHING FOR SPRAY PAINTING

BINKS

Rugged, long-stroke air motor provides pressure ratios from 1:1 to 10:1.

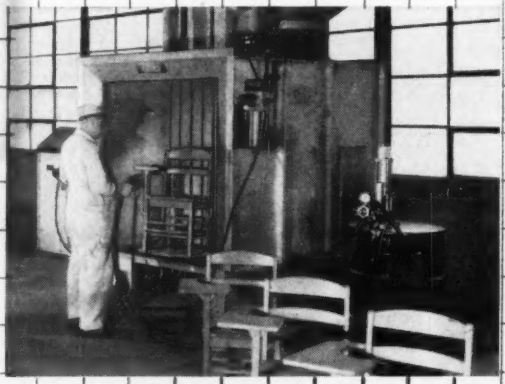
Special, pressure lubricated packing protects the motor ... minimizes maintenance costs.

Double acting pistons pump material on both up and down strokes ... insure smoother flow of material. Top piston prevents material from working up the cylinder to the packing.

Large, unobstructed opening at floor level completely empties the drum.

a better

MATERIAL HANDLING PUMP by Binks



Binks material handling pumps are made in three types:
Type A: (cutaway illustration) for use in open 55 gallon drums
Type B: for use in standard 2" bung hole of 55 gallon drum
Type BS: for use in five gallon container

A highly developed pump for use with fine finishes

INCREASES PRODUCTION 15 PER CENT...With this new Binks equipment you pump directly from your supply drums...saving up to 6 cents per gallon on handling time alone. Cuts "down time" to the minimum because no time is lost filling tanks or in cleaning operations.

GIVES BEAUTIFUL FINISHES...By using a Binks pressure material regulator in conjunction with this new Binks Pump, absolute and precise control of material pressure is simple. Material reaches the spray guns in a steady stream free of all pulsation ...ideal for the application of even the finest finishes.

HANDLES ALL FLUIDS...Binks air-operated Pumps are available in pressure ratios from 1:1 to 10:1. They will pump all fluids...from thinner to calking materials...including fluids containing abrasive materials.

LOW MAINTENANCE AND OPERATING COSTS... A Binks Pump operates on minimum quantity of air from your regular supply. Simple rugged construction. Cleans itself by simply pumping a solvent.

Send today for new Bulletin 700 describing Binks material pumps and related equipment.

"A better product for American industry is ever the goal of Binks engineers." Burke B Rock President

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Fig. 1—Almco Supersheen Finishing Barrel Model DBO-1

media, loading and unloading, according to the manufacturer, Almco, Division of Queen Stove Works, Inc., Albert Lea, Minnesota.

The unit is equipped with a variable speed drive which provides speeds from 25 to approximately 60 r.p.m. The "twin" barrels measure 8 x 16 inches and are available with or without ¼-inch Neoprene lining. All moving parts are safely enclosed with the safety hood, and the construction is of heavy welded steel.

Measuring 36 inches long x 36 inches wide x 50 inches high, Model DBO-1 is recommended for the processing of small lots of parts, the processing of close tolerance work, and for research and development projects.

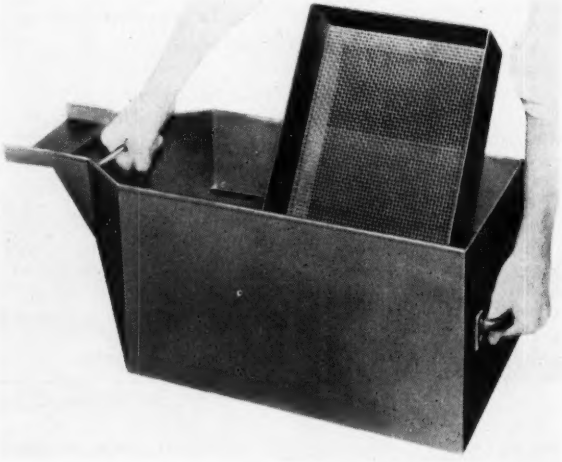


Fig. 2—Removable drain drawer and separating screen

Clear Finishes for Zinc Protection

Manufacturers and plating shops now switching to die castings and zinc plated steel can protect those parts with a special clear lacquer or a synthetic finish, according to the Maas & Waldstein Co., 438 Riverside Ave., Newark 4, New Jersey.

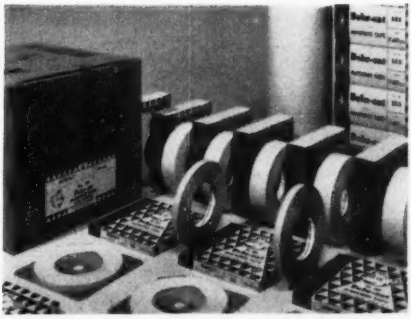
The finishes are Dulac Clear Universal Lacquer No. 462, which is air-drying, and Codur Clear Synthetic Y743 for baking. Both have fully demonstrated their ability to stand up under salt spray and weatherometer tests for the exceptionally long period of 800 hours, it is claimed.

Zinc die castings protected with these coatings are said to show no discoloration, even after long periods of service.

Behr-cat Masking Tapes

Behr-Manning Corp., Troy, N. Y. (Division of Norton Company), has offered for industrial application a line of paper-backed, pressure-sensitive tapes under the trade name Behr-cat Brand Masking Tapes.

Designed for a wide variety of applications, the tapes are adapted to masking, as in spray or brush painting; stencilling, as in screen or stencil painting; packaging, as for shipment or storage; sealing, as for dustproof containers; holding, as for loose parts in assembly; labeling, as on goods transferred from original container; and surface protection, as glass



Assorted rolls of Behr-cat Brand Masking Tapes showing product labeling, and in foreground, the specially designed "Spred-Lok" that anchors the core and supports the weight of the roll to prevent the development of flat spots.

from chipping, and equipment in transit.

Correct tackiness for faster application, better flexing to contours, dead-stretch that prevents creep-under of paint, thinness that prevents build-up of paint, ideal performance in high temperature work, better balance between tensile strength lengthwise and tear strength crosswise, and "no residue" strip-off in unmasking are among the benefits claimed by Behr-Manning.

Behr-cat Brand Masking Tapes are available in standard length rolls of all popular widths, boxed or bulk packed.

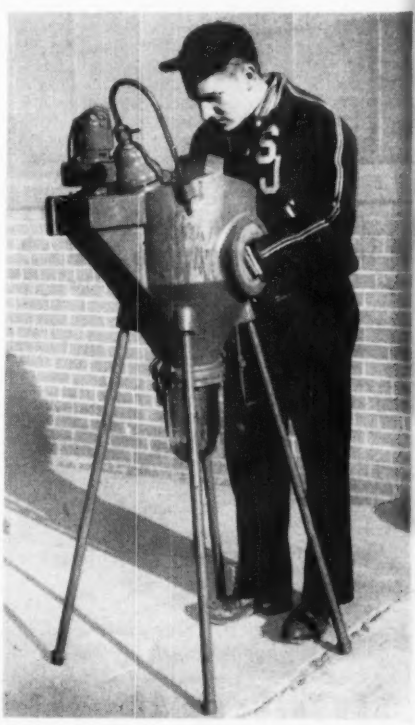
Midget Unit for Liquid Blast Cleaning

A midget unit produced by the Pangborn Corp., Hagerstown, Md., for liquid blast cleaning, weighing only 40 pounds (where aluminum can be used for the main housing), operable from either a ¼-inch compressed air line or any bottle of compressed gas, and featuring a blast chamber 15 inches in diameter, offers the advantages of modern blasting methods. Further, according to the company, it provides a small, portable device for occasional work, small parts, and experimental use.

In metalworking and machinery the principal fields of usefulness recommended for the unit are: die and mold polishing after heat treatment, precision part polishing, treating metal surfaces to effectively hold light lubricating oil films, preparation for plating, tool and fixture maintenance and cleaning, cleaning of parts which function at high temperatures, and stain and light scale removal.

Designated as the No. O Type EZ Hydro-Finish Blast Cabinet, the unit uses the same wide range of abrasive (as fine as 5000 mesh) as the larger models, and can hold tolerances on blasted parts to within 0.0001 inch. It requires only 17 x 22½ inches of floor space; stands on easily adjusted legs of standard ½-inch pipe (can be bench mounted if desired); requires only 110-volt a.c. to drive its filter and dust bag motor; consumes from 5 to 20 c.f.m. of air at 80 p.s.i., depending upon nozzle size; and is provided with a chamber light, right and left hand holes, a quick-opening valve for knee or leg operation, and an ample observation window protected from splash and dirt by a cross current of fresh air.

The abrasive-liquid mixture is slurried (and constantly bubbled) in a clear glass bowl of ½-gallon capacity at the base of the unit. Two sizes of suction-type blast nozzles are available, the air-stream and



No. 0 Type EZ Hydro-Finish Blast Cabinet in use

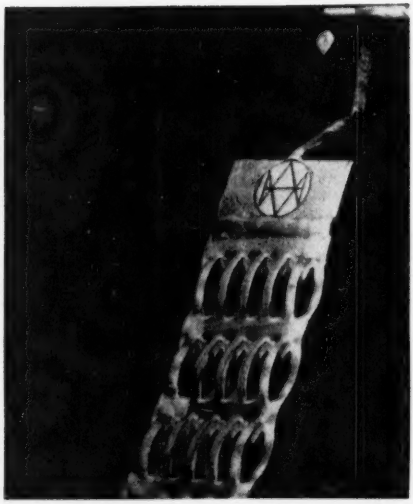
abrasive-stream port sizes being $\frac{1}{16}$ inch and $\frac{1}{8}$ inch, or $\frac{1}{8}$ inch and $\frac{1}{4}$ inch.

Loading and part manipulation is easy and quick through a large top plate (containing the observation window) resting at a convenient angle atop the one-piece cast aluminum chamber.

Chromium Plating Anode

Hanson-Van Winkle-Munning Co., Matawan, N. J., has developed a chromium plating anode called Chrome-Flo which is especially recommended for the following qualities: insoluble chromate film formation on the anodes is markedly decreased with the use of special alloy lead Type "S"; the open construction makes high current densities possible due to better circulation of the solution and increased anode surface exposure; decreased weight facilitates easy handling; due to wider current density range, there is better covering power, especially on difficult-to-plate parts.

According to the company, it is best to keep the current turned on at all times when the anodes are in the bath. Anodes should be removed, rinsed, and stored in the air when the tank is idle. If this procedure can be followed, anodes will always be ready for use without periodic scrubbing.



Chrome-Flo Anode for chromium plating

Chrome-Flo Anodes can be furnished in 6 per cent antimony lead, 7 per cent tin lead, or any other commonly used alloy.

Gardner
FILM THICKNESS GAGE

• Write for descriptive leaflet and prices.

GARDNER LABORATORY
Bethesda • Maryland

Rotary Automatic Spray Painting Machine

An entirely air-operated machine for rapid automatic spray painting of as many as three colors simultaneously on a variety of small parts, has been developed by Conforming Matrix Corp., 356 Toledo Factories Bldg., Toledo 2, Ohio.

Parts are fed into mask holding fixtures which are an integral part of the rotary table. The machine illustrated herewith is capable of a capacity of 18,000 completed pieces, painted three colors, each eight-hour shift. There are 24 masks, eight for each color.

The machine is powered by 90 pounds constant air pressure, and the hazards of electric motors and switches are eliminated. At top speed, the 800-pound rotary table indexes 22 times per minute, with 90 pounds pressure, attaining a perimeter speed of 50 miles per hour during the short three-foot indexing travel.

Painting occurs while the table is at rest. After the painting of each color, the operators move the parts from one color

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Uncle Thud's been getting around lately, for it's true. You just can't beat VEDOC Defense Paint for a good protective finish.

With our World War II experience to draw from, our research staff has been busy finding new and improved ways to give you the very best in government specification finishes . . . finishes that work best with your own coating methods. And we've expanded our production facilities to serve you quicker . . . more efficiently.

Whether your orders are for gallons or drums, each one receives the same prompt and thoughtful attention that has helped Ferro build a reputation as a good, dependable source of supply.

When you bid on Defense Orders calling for specification finishes, let us help you. Write to Ferro for quotations and assistance on any Defense Paint problems.

Remember, Ferro is set up to provide Complete Organic Coatings Service. From the development of diversified protective coatings—to the designing and installing of efficient finishing oven systems

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LIQUID PLASTICS DIVISION

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Vedoc

Rotary Automatic Spray Painting Machine in use

mask to the next. No spraying can occur while the table is in motion. One operator removes the finished pieces.

Fourteen A.G.A. automatic DeVilbiss spray guns are so mounted underneath the table as to be easily accessible for inspection and adjustment. Properly placed baffles and an efficient exhaust system preclude the intermingling of colors on the parts as the three colors are sprayed simultaneously, the company states.

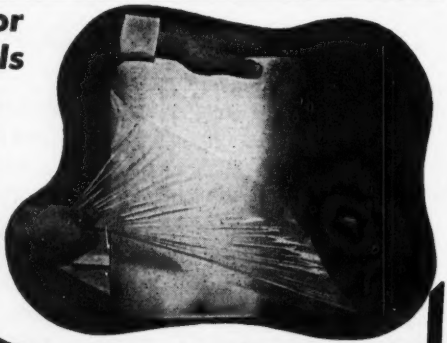
To maintain proper viscosity, the paint is continuously circulated from the containers through the guns, even when painting is momentarily suspended.

There are only three controls; one for regulating atomized air from the guns, one to adjust the speed of cycling, and one to regulate the amount of paint applied, or film thickness.

Snug fit of the pieces in the masks is automatically assured by air pistons, it is claimed. The table cannot index until the pistons release. The movement of the rotating table is then accomplished by a driving arm powered by air and hydraulically checked. The driving pin, in the

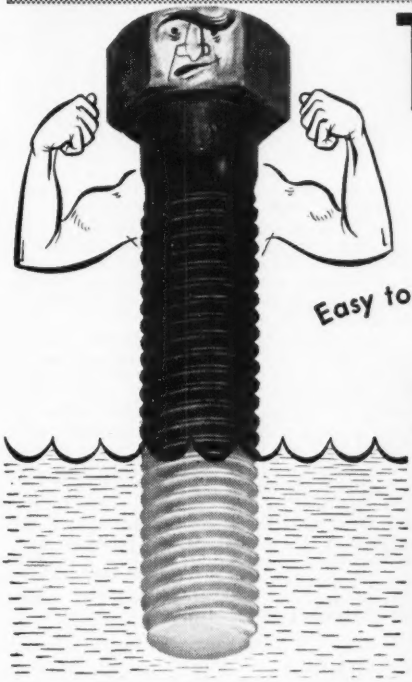
A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust. Also available as a booth coat protection.



THE STRIPLASTIC COMPANY
10828 QUEBEC AVE.
CLEVELAND 6, OHIO

Among many advantages, it is nontoxic, possesses great tensile strength and is easily stripped off in one piece. Write for complete information on this new strippable plastic.



TOUGH cleaning jobs turn "SISSY"!

Easy to handle with

HOUGHTON'S HOUGHTO-CLEAN 220

Emulsion Type Cleaner*

HOUGHTO-CLEAN 220 forms a stable non-foaming emulsion with water—hot or cold. It removes processing oils, dirt and coatings from metals without harming the surface. It is equally effective in spray, dip and power washing . . . for either ferrous or non-ferrous metals. And because it can be diluted as much as 1 to 50 parts for power washing you'll find HOUGHTO-CLEAN 220 most economical to use. Write E. F. Houghton & Co., Philadelphia 33, Pa.

* This emulsion type cleaner can be used in many places instead of alkaline cleaning. Also, many users have found HOUGHTO-CLEAN 220 a superior replacement for either straight petroleum solvents or non-flammable solvents.

Write for Data Sheet on
HOUGHTO-CLEAN 220

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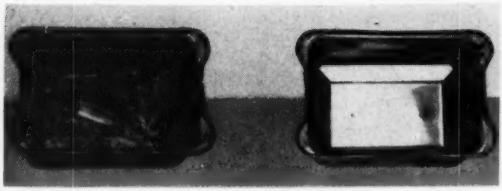
Ready to give you on-the-job service . . .



Drawn steel box before and after removal of drawing compound by Magnus Emulso-Clean Process

driving arm, moves the table to its successive index positions as it engages on its forward thrust. A locking device aligns the table in proper gun position as the pin is retracted. The entire machine is automatically lubricated.

Similar machines, but with variations to fit the specific requirements of each manufacturer, are also designed by Conforming Matrix Corporation.

"Emulso Clean" Process

The Magnus Chemical Co., Inc., Dept. PF, Garwood, N. J., is offering its "Emulso Clean" Process for removing contaminants resulting from metal processing operations of all kinds.

The Emulso-Clean Process is said to be especially effective for removing smut, lithopone, chalk, tripoli, chlorinated and sulfurized oils, and other stubborn contaminants quickly and completely, eliminating the need for hand scrubbing.

The Process utilizes Magnusol, an emulsion cleaner supplied in a concentrated form to be mixed with safety solvent. This neutral, oil and water-soluble penetrating agent is non-flammable at working temperature.

The work to be cleaned is either dipped in a tank of one part Magnusol and eight parts safety solvent, or sprayed with the mixture for about 30 seconds. It is then removed, allowed to drain, and after a rinse with a water spray, the metal surface is left physically clean. A final hot water rinse can be used if the work requires self-drying.

According to the manufacturer, the Emulso-Clean Process is safe to use on all metals and is particularly recommended for steel because it leaves a slight trace of solvent which provides temporary rust protection. It is non-toxic, non- corrosive, and non-irritating.

Powerful, direct-connected (no gears), 3450 r.p.m., 100-120 v AC air-cooled motor. All sealed ball-bearing construction. Die-cast aluminum housing, polished. All-position handles. In hand weight only 5 lbs. Insulated with ground wire for wet as well as dry sanding or rubbing. Available accessories—deep contour pads, surface plates, felts, etc. Takes any sheet abrasives—3 covers 4½" x 6½" from standard 9" x 11" sheet.

A time saving quality tool priced so every worker can have one.

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SpeedWay MANUFACTURING CO.
1895 So. 52nd Ave., Cicero 50, Ill.

"Platelustre" Finishes

Known as Platelustre, finishes closely simulating the appearance of copper, brass, and bronze when applied over zinc, steel or zinc-plated steel have been developed by The Maas & Waldstein Co., Newark 4, N. J. The coatings have satisfactorily withstood 800 hours' salt spray and weatherometer tests, the manufacturer states. Platelustre is available for both air-drying and baking schedules.

Bakelite Polyethylene Coating for Shipping Containers

Shipping of materials ranging from edible foods to corrosive acids and alkalies costs less in new and reconditioned steel drums, pails, and hackney-type drums coated with Bakelite polyethylene. This interior coating resists moisture and most chemicals at all ordinary temperatures. Flexible and tough over a wide temperature range, the continuous coating adheres strongly to the steel con-

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Army and Navy Specification Finishes
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Aircraft Dopes—Nitrate Dopes
Randolac S F for Metal
Plywood Sealer A-17
Randolph Lacquer XF for Metal
Red Oxide Primers
Colored Lacquers, Metal, Series 2200
Acetate Butyrate Dopes
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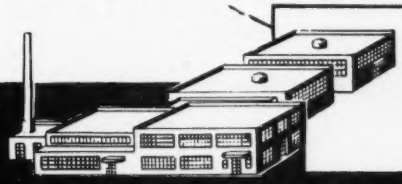
What is the secret behind the mighty force of American Production?

The answer is know-how—as demonstrated by RANDOLPH in supplying GOVERNMENT SPECIFICATION FINISHES that help achieve production goals. Go into the factories where America's military and civilian needs are being met—and you'll find RANDOLPH giving the special qualities of a superior finish to products ranging from aircraft and ammunition to tractors and appliances.

Get a RANDOLPH FINISH in any quantity—on time! Write us today to avoid any finishing problems.



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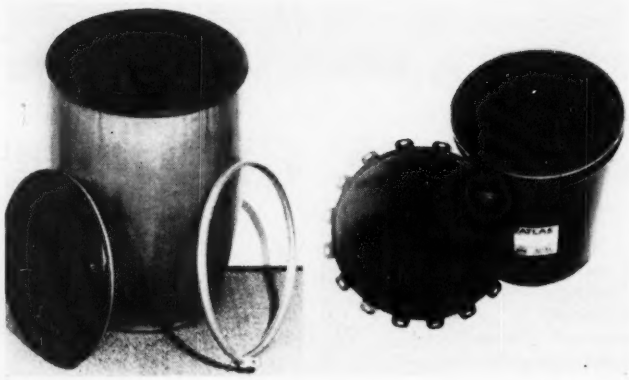

Steel drums coated with Bakelite polyethylene

tainer when applied and maintains this adhesion continuity under rough shipping conditions. The lining, through the application method, has eliminated the chime of the container, so packaged products contact only the relatively inert Bakelite polyethylene, never the metal.

Substances formerly shipped in containers made of special metals or other materials can now be transported in the coated drums or pails at a fraction of the cost. Merely washing out the inside reconditions the coated containers, and the containers can be reused many times. The manufacturer reports some of the substances successfully shipped in these coated containers include detergents; dyestuffs; sodium hypochlorite; nitric; hydrofluoric, sulfuric, phosphoric, hydrofluosilicic and fatty acids; formaldehyde, and many other edible and non-edible products. Tested with copper sulfate and muriatic acid, the Bakelite polyethylene coating, according to the Bakelite Co., 122 E. 42nd St., New York 17, N. Y., showed no trace of copper deposits after 168 hours.

Bright Finishes for Metals

Durable bright finishes which do not require use of either copper or nickel can be obtained with processes developed by United Chromium, Incorporated, 100 E. 42nd St., New York 17, New York.

One finish is produced with zinc plate, Unichrome Clear Dip, and Unichrome Baking Synthetic B-115. This finish has eye appeal similar to that of chromium plate and it possesses the well-known protection against rusting of zinc, it is claimed.

To produce this finish, the article is zinc plated to a thickness of 0.0002 to 0.0005 inch, depending on the application, and then treated in Unichrome Clear Dip. This part of the process is flexible, allowing for manual, semi-automatic, or full automatic operation. After the clear dipping operation, the parts are dried and given a dip or spray coat of Unichrome Clear Baking Synthetic B-115.

Another finish is chromium plated directly on the basis metal and the chromium coated with a durable, clear baking synthetic. On steel, the finish is simple to produce. On die castings, however, chromium is deposited as a relatively gray plate which requires buffing to bring up the luster. Whether plating steel or zinc die castings, it is advisable to deposit several times the amount of chromium normally used for decorative work. The

NEW-IMPROVED!

BLACK MAGIC

BLACK OXIDE PROCESS
for STEEL and IRON

As pioneers in the field of black finishing, our laboratories have now produced this new blackening salt which is a decided improvement over regular types — both in speed of application and corrosion resistance — plus ease of blackening previously hard-to-blacken items.

Compare these outstanding features!

- ★ One bath! One salt!
- ★ Faster blackening cycle
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Write for further details *Send items of your own manufacture for sample processing.*

MITCHELL-BRADFORD CHEMICAL COMPANY
MODERN METAL FINISHES
2446D MAIN ST., STRATFORD, CONN.

BLACK-MAGIC OXIDE BLACKING SALTS
WITCH-DIP & WITCH-OIL FINAL FINISHES

SILCO *Glass-Base* PROTECTIVE COATING
HEAT TREATING SALTS. CLEANERS. ETC.

Unichrome Self Regulating High Speed Chromium Plating Bath is recommended because of its additional plating speed and also because it plates brighter than ordinary chromium solutions on zinc. Unichrome Clear Baking Synthetic B-115 is said to be ideally suited to this finish because of its excellent adhesion and resistance to abrasion and atmospheric discoloration.

Pocket pH Meter and Probe Unit

A pocket-size pH meter and companion probe unit, available from Analytical Measurements Inc., 585 Main St., Chatham, N. J., permit instant, on-the-spot pH determinations anywhere. Completely self-contained with batteries, in a Bakelite case 3 x 5⅞ x 2½ inches, the instrument is furnished, camera fashion, in an ever-ready case with novel plastic tubes of buffer and KCl solutions. Total weight is 3 pounds. Both water-proof and fungus-proof, the ever-ready case comes with a combination hand-and-shoulder strap, allowing the instrument to be slung over the shoulder or hung around the neck, leaving both hands free.

Supports and beakers are completely eliminated by combining the calomel and glass electrodes with the sample holder in a single polyethylene probe unit.

Pocket pH Meter and Probe Unit

The meter is scaled from 2 to 12 pH for easy reading, and a simple adjustment gives readings from 0 to 14. Accuracy of 0.1 pH is obtainable. Hearing-aid type batteries provide up to 1300 hours of operation. The electrometer tube, switch, and input connector are sealed in a single unit to ensure freedom from high humidity difficulties. Grounded samples can be measured directly because of no external power connections. The instrument and electrode are completely shielded.

Park No. 290

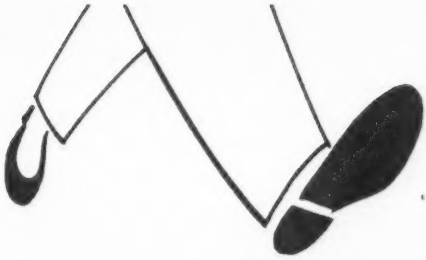
BLACKENING SALT

Black Oxide finishing for rust resistance and decorative parts. Speedy black coating in water solution with no electric current. Permanent black finish on ordnance parts, tools, aircraft, bearing races. Dazzling black decorative finish for television cameras, business machines, hardware, metal screens and machine parts. Excellent bond for paints and enamels. Simple one bath operation. Write for bulletin H-16. Park Chemical Co., 8074 Military Ave., Detroit 4, Mich.

Protective Coatings

Strathmore Products, Inc., 1970 W. Fayette St., Syracuse 4, N. Y., has announced two protective coatings for use over Iridite and other metal-finishing processes to produce an attractive, durable finish similar to chromium plating, without the use of copper, nickel, or chromium. These coatings add greatly to the life of chromium plating, it is said.

Applicable by spray or dip, Baquik Clear Coating X2534 is a baking type (range 225 deg. F. for one hour to 300 deg. F. for 15 minutes) and Metalbond Clear Coating SL-300 is an air-drying type. Both coatings are water-white, contain a large percentage of solids, and will not discolor. According to the manufacturer, both have a high resistance to impact and abrasion and have withstood 200 hours of salt spray with no visible breakdown of the film.



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Featured articles, as well as the official program of the convention, assure intense readership. This issue will give comprehensive information to those unable to attend and will serve as a guide to those attending.

Already circulated to more electroplaters and allied trade readers than *any other* publication, extra copies of July PRODUCTS FINISHING will be distributed at the Convention. This is an extra bonus to advertisers. PRODUCTS FINISHING regularly goes to a total circulation of more than 18,000.

Since there will be no exhibits of equipment or supplies, display your products in the pages of the Convention Issue of PRODUCTS FINISHING. Plan to use enough space to do a thorough job at this most important meeting.

The Convention is the Electroplating Industry's best market place. Use July PRODUCTS FINISHING . . . the industry's best showcase. Forms close June 8th. Make your space reservation now or write for additional information.

PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio

Metal Cleaner

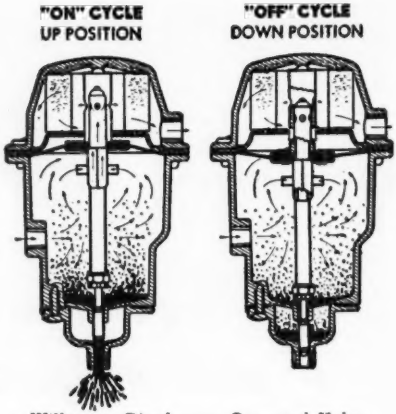
Westville Laboratories, Monroe, Conn., is manufacturing a wipe-off metal cleaner known as "Metal-Redi" which not only removes rust, grease, and oil completely but at the same time leaves an iron phosphate coating which is a firm bond for all types of paint.

The dual-purpose cleaner is said to be very simple to use: apply with brush or steel wool, scrubbing if necessary, wipe off with a cloth, allow to dry 5 to 10 minutes, and then paint.

Wilkerson Diaphragm Operated Valve

A line of valves for automatic removal of contaminants and precipitates from compressed air lines, after-coolers, sumps, tanks, and air brake systems has been announced by the Wilkerson Corp., 1749 S. Broadway, Denver, Colorado.

Claims made for the equipment include elimination of manual attention or adjustment, as well as savings in man-hours, critical maintenance materials, air tools repair parts, and pneumatic machine replacements. The line includes automatic separators and drains and has been field tested in hundreds of industrial installations as well as on truck, bus and railroad locomotive equipment.



Wilkerson Diaphragm Operated Valve

The cross-sectional view shows the Dia-

Clean and Phosphate *in ONE OPERATION!*

PHOSCOTE, the new type product of Pelron Corporation, does the job quicker, better, at less cost. Prevents under-film rust and corrosion—adds life to finished product.

Increases paint-adherence through fine, evenly dispersed phosphate coating.

Non-Toxic • Non-Corrosive • Easy To Use

Does not sludge out in operating tank. Economical to use on steel and aluminum due to low concentration.

Write for Technical Bulletin

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Manufacturers of Phosphating Chemicals That Conform to Gov't. Specifications

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A complete line of Automatic Polishing, Buffing and Grinding Equipment engineered to the job
MURRAY-WAY means the "better way" in automatic buffing, polishing and grinding. Here we show a representative group of MURRAY-WAY equipment now in use in plants throughout the country. Even your toughest surfacing problems may be solved automatically and economically through MURRAY-WAY equipment and engineering experience.
(A) Six Micro-Polish Units in Series
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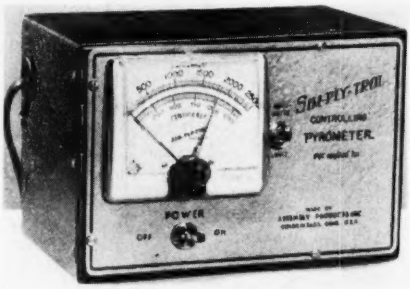
(C) #60 Polishing-Head
(D) 60 Series Belt Polishing-Head
(E) Horizontal-Platen Conveyor
(F) Continuous Dial-Table
(G) Six Station Dial-Table
(H) Vertical-Platen Conveyor
(I) #50 Universal Polishing Head
(J) Indexing Dial Table
(K) Straight Line Conveyor
MURRAY WAY
MURRAY-WAY CORP.
Maple Road E., Birmingham, Mich. P. O. Box 180,
AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

phragm Operated Valve. When the air line is not in use, the diaghragm is forced down by back pressure with the O-ring sealing the sump bottom. As air is used, the pressure differential raises the diaphragm and shaft, seals the bottom of the middle chamber, opens the bottom of the sump, and blasts out contamination.

Large Scale Pyrometer Controls

Simplytrol Pyrometer Control (4530 Series) with a large 4½-inch meter which can be set to the control temperature with ease and accuracy and read at a distance has been announced by Assembly Products, Inc., Chagrin Falls, Ohio. The panels and cabinet of the improved unit are now made of heavier gauge steel; corners are reinforced. Three-point suspension prevents pulling the cabinet out of shape when it is screwed down on an uneven surface.

Plug-in connections between the control and the terminal board permit easy removal or replacement of the Simplytrol without disturbing any of the permanent connections. The Simplytrol Contact Meter Relays, center of the control action, are readily interchangeable for different temperature ranges. Thermocouple lead length can be compensated by the user. No special calibration is required for this adjustment.



Simplytrol 4530 Series Large Scale Control

The Simplytrol Automatic Pyrometer Control (4540 Series) may be used for automatic on-and-off control to maintain a pre-set temperature. It has a switch to change it from automatic to limit control. As a limit control, it is a shut-off device or safety warning unit which will make contact when a pre-set temperature is reached, to sound an alarm, or shut off a furnace. The contact holds until re-set.

Purico Pur-Bur Composition

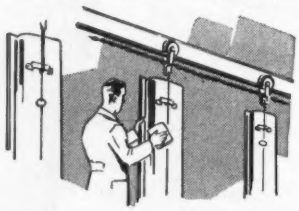
Designed to remove flaws, cracks, gouges, burrs, and other metal imperfections formed as a result of casting, shearing, or metal working operations, a self-lubricating compound designated as Pur-Bur has been announced by The Puritan Manufacturing Co., 29 Benedict St., Waterbury 65, Conn. This product removes objectionable surface imperfections easily, quickly, and economically, the manufacturer states.

One procedure used for the removal of severe burrs involves the coating of an ordinary hard felt wheel with 90 or 120 emery, drying, pounding with a lead pipe to soften the wheel, and then applying Pur-Bur liberally to the surface. The abrasive grain produces a hard surface and a cutting edge while the Pur-Bur Compound acts as a lubricant and prolongs abrasive life. A similar procedure involves the use of a tapered felt buff coated with abrasive and Pur-Bur, and used on a lathe for deburring operations.

The manufacturer points out that Pur-Bur works equally well for other applications when applied to a hard sewed buff, brushes, or Tampico wheels.

DUST-ALL Tack Rag

for better, cleaner finished jobs



Remove the specks, lint, dust from surfaces to be painted; wipe them off with a Dust-All Tack Rag; be sure of fine, blemish-free, finished jobs.

Get the Dust-All Tack Rag in the familiar Red Checkered Bag; also available in 150-250-500 yard rolls.

HARDING Manufacturing Co.

10634 GRATIOT AVE.
DETROIT 13, MICH.

You WILL BE IN GOOD COMPANY when YOU USE...

SURPHOS

Metal Phosphating Chemical

Currently Used On:

Sheet Steel, Machined and Cast Iron . . . Truck Hoods and Fenders . . . Auto Accessories . . . Tractors and Accessories . . . Clothes Washers . . . Stoves . . . Dish Washers . . . Hot Water Heaters Jackets . . . Air Conditioning Cabinets . . . Gas and Oil Space Heaters . . . Outboard Motors . . . Toys . . . Agriculture Implements . . . Lighting Fixtures . . . Diesel Locomotives . . . Many other items.

TO USE SURPHOS:

. . . dissolve in hot water to a concentration of one ounce per gallon and apply to metal by dipping or spraying in a power washing machine. Acid proof equipment not needed.

SURPHOS *Conditions Metal For Painting:*

- **CLEANS**
- **FORMS PHOSPHATE COATING**
- **PREVENTS RUSTING**
- **IMPROVES ADHESION of PAINT**
- **INCREASES HUMIDITY and SALT-SPRAY**
- **RESISTANCE OF PAINT**

INDUSTRIAL CHEMICAL PRODUCTS COMPANY

3778 BELLEVUE AVENUE **DETROIT 7, MICH.**

Representatives In Principal Cities

In Canada made and sold by Boyle Chemicals Ltd., Windsor, Ont.

Stripping Service

Stratford Co., Dept. M, 207 Bay St., Bridgeport, Conn., has announced the development of a stripping process for removing metal coatings. The company utilizes the process for custom stripping.

It is stated that chromium, nickel, and copper can be stripped from zinc-base alloys, aluminum, copper, brass, and steel without etching or pitting of the base metal. Zinc die castings are stripped clean so that they can be rebuffed to a high luster by means of only a wheel wipe.

Saf-pHilm

Product of the Swan-Finch Oil Corp., Dept. PF, R.C.A. Bldg., West, New York 20, N. Y., Saf-pHilm Rust Preventive makes a quick-drying coating of a distinctive translucent color. Easy to apply, this solvent-type organic material protects highly finished surfaces, parts, and equipment prior to shipment or storage.

According to the manufacturer, Saf-pHilm resists acids, alkalies, and abrasives. The coating sets up within 15 minutes and is easily removable with kerosene or a similar solvent.

Looking for a Better Finish?

Try

HARRISON'S

4A

TAILOR-MADE BUFFING & POLISHING COMPOUNDS

for

Aluminum, Brass, Copper, Stainless Steel, Carbon Steel, Etc.

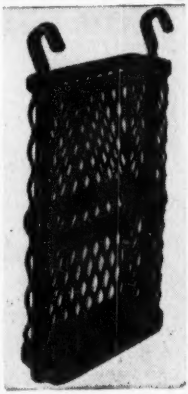
EMERY CAKE, GREASE STICK

CEMENT AND THINNER
for setting up wheels, belts, and rolls

HARRISON & COMPANY, INC.
Haverhill, Massachusetts

Improved Scrap Anode Basket

An improved heavy-duty scrap anode basket that gives long service has been developed by the Belke Manufacturing Co., 947 N. Cicero Ave., Chicago 51, Illinois.



Improved Scrap Anode Basket

The basket is constructed of heavy gauge expanded steel welded to a frame of $\frac{3}{16}$ x 1-inch steel members. Bands on the sides and bottom of the basket and hooks are of one continuous $\frac{3}{16}$ x 1-inch steel piece to provide maximum strength to the frame.

According to the manufacturer, an extra heavy coating of Belke Universal Plastic provides positive protection from sharp anode scraps and rough handling, and withstands all plating solutions.

All Belke Scrap Anode Baskets are made to specified dimensions, and filter bags can be furnished for them.

SIP Synthetic Gold Enamel

A high luster finish with good adhesion properties to replace brass plating on zinc alloy and aluminum die cast parts has been developed by Standard Industrial Products, Inc., P. O. Box 325, Evansville, Indiana.

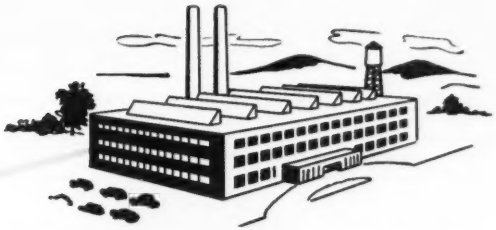
Marketed as a member of the Wear-Master line, the gold-colored finish is said to be highly resistant to perspiration

CORROSION-PROOF PROCESSING TANKS

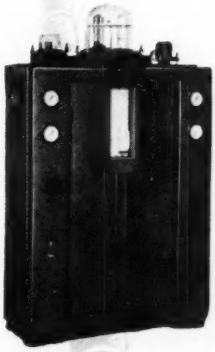
- Corrosion-proof construction of processing and storage tanks; industrial flooring.
- Experience serving major steel, chemical, textile and food plants.
- Complete Facilities: Design; Engineering; Material; Construction; Maintenance.

Write for bulletin giving complete details

CHEMSTEEL CONSTRUCTION COMPANY, INC.
301 Chemsteel Building, Walnut Street, Pittsburgh 37, Pa.



CHLORINATION *Employed...* CYANIDES *Destroyed*



The treatment of cyanide wastes is a difficult problem which is growing more acute daily. Increasingly stringent stream pollution legislation has placed a heavy demand on industry for the complete destruction of cyanides.

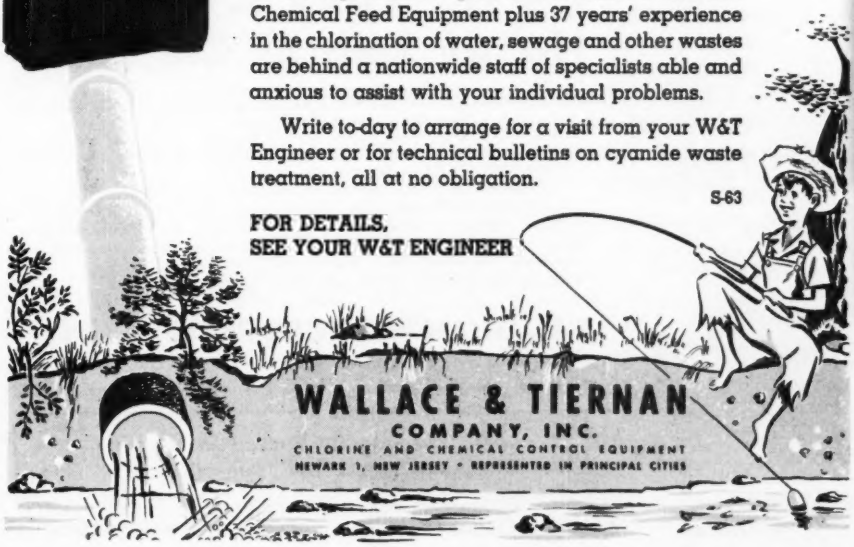
Effective, economical treatment of cyanide wastes requires know-how and experience. The Wallace & Tiernan organization brings you both from its record of equipment installations in over 25 cyanide waste treatment plants.

A complete line of proven W&T Chlorinators and Chemical Feed Equipment plus 37 years' experience in the chlorination of water, sewage and other wastes are behind a nationwide staff of specialists able and anxious to assist with your individual problems.

Write to-day to arrange for a visit from your W&T Engineer or for technical bulletins on cyanide waste treatment, all at no obligation.

S-63

FOR DETAILS,
SEE YOUR W&T ENGINEER



WALLACE & TIERNAN
COMPANY, INC.
CHLORINE AND CHEMICAL CONTROL EQUIPMENT
NEWARK 1, NEW JERSEY • REPRESENTED IN PRINCIPAL CITIES

acids, has excellent adhesion qualities and good color, and is unusually scratch resistant. It stands up well under salt spray tests.

Applied by conventional methods and baked on, the SIP Synthetic Gold Enamel causes no application problems, and its high gloss effect is reported to be hard to differentiate from plating.

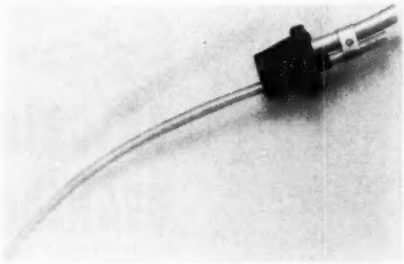
Metallic Bronze Lacquers

Metallic Bronze Lacquers, recommended for any purpose where a metallic effect is desired, have been announced by National Lacquer and Paint Co., Inc., 7415-39 S. Green St., Chicago 21, Ill. Fifteen shades are included in the standard line, with other colors supplied on special order. All of these are designed to simulate closely the appearance of plated metal.

In the formulation of the Metallic Bronze Lacquers no dyes or bronze powders are used. Particle size is controlled by rigid selection of raw materials to give maximum luster and reflectivity. Complete dispersion of pigments is obtained through special processes.

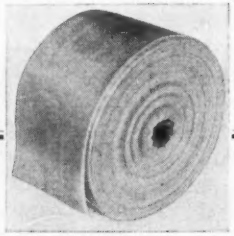
Safety Air Vent Carboy Pouring Spout

Supplied by the Hanson-Van Winkle-Munning Co., Matawan, N. J., is a safety air vent carboy pouring spout, which ensures an even flow of acid without spurts or splashes. It is made of acid-resistant rubber and plastic tubing built for long wear.

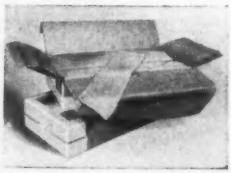


Safety Air Vent Carboy Pouring Spout

All parts of the carboy are replaceable and one size spout fits all carboys.



IN ROLLS
Cut off any size piece and use as needed.



CUT BULK
Already cut and folded, ready to use.

NOW! Tack Cloth in Handy Rolls or Cut Bulk

Now you can get Tack Cloth packed the way it's easiest for you to use—either in 150 yard rolls of 36" wide cloth or in handy cartons—100 or more Tack Cloths to the carton.

No matter which way you buy it, you can be sure that every square inch will *stay* SOFT and TACKY until the very last bit is used up.

The Cut Bulk size is 18" x 36"—folded to 4½" x 18" for easy handling. *All of our Tack Cloth is Spontaneous Combustion-Proof, Lint-Free and Wax-Free.* It's clean and sanitary—*there's no waste.*

Write today for complete information, prices and samples.

BAUGHN CHEMICAL PRODUCTS CO.

The Tacky Wiper Specialists

7019 N. Ravenswood **Chicago 26, Ill.**

Also Individually Packed in Glassine Envelopes — 144 to the Carton

— A WARRANTY OF SATISFACTION IN EVERY CARTON —

The right START

to the best FINISH!

To obtain the best finish on your final polished product, it is necessary to start with good equipment. The wheel must operate at proper speed and without vibration.

HISEY Buffing and Polishing Machines are designed and constructed to do just that and much more. Operator has plenty of foot room and freedom of operation about the wheels to produce quickly with a minimum of effort.

All moving parts subject to wear are made with liberal reserve capacity and of materials scientifically selected.

All the above added together equals quality product, maximum production, low labor cost and minimum maintenance.
HISEY Buffing and Polishing Machines are made in a wide range of types and sizes from ¼ H.P. bench mounted to 50 H.P. capacity.

DUST COLLECTING EQUIPMENT ALSO AVAILABLE

Hisey THE HISEY-WOLF MACHINE CO.
CINCINNATI 8, OHIO
Division of The Cincinnati Electrical Tool Co.

CATALOG 71 PH FREE ON REQUEST

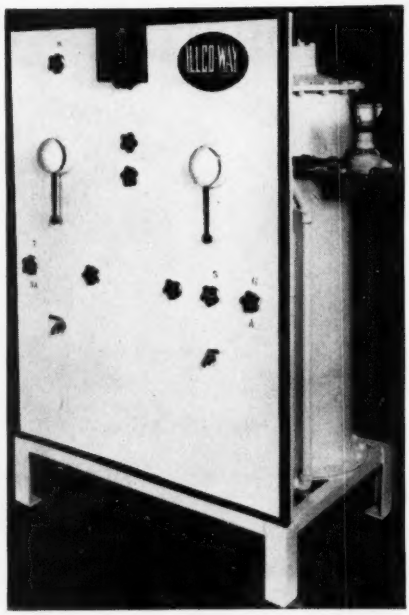
Conductive and Non-Conductive Plastics

Atlas Mineral Products Co., Mertztown, Pa., has developed a resin cement called Conductoplast, which may be cast in almost any form and exhibits practically no voltage drop when used as a conductor. It can be plated readily, has a tensile strength of 1500 p.s.i., a compression strength of 15,000 p.s.i., and provides excellent adhesion to ceramic materials.

A non-conductor called Resistoplast has many of the same properties as Conductoplast except that it does not conduct current. Both materials are available in pilot plant quantities, and production facilities can be expanded for critical end use.

"Packaged" Water-Treatment Units

The Illinois Water Treatment Co., 840 Cedar St., Rockford, Ill., has announced a complete line of "package-type" deionizing units ranging in size from 12 to 1,000 gallons per hour. Larger sizes are engineered to meet specific requirements.



Illco-Way "Packaged" Water-Treatment Unit

The series includes six sizes of the Illco-Way Mixed-Bed De-Ionizer which will produce water containing less than 0.1 p.p.m. total dissolved solids with silica less than 0.02 parts per million.

BOOTHCOTE

cleans spray booths quickly, economically, safely!

Spray Boothcote on clean booth. Surplus paint can then be peeled off in sheets by any operator.

- Saves time and labor
- Time-tested; used for 14 years
- Mixed—ready to use
- Can be brushed or sprayed
- Non-inflammable; safe to store
- Does not flake off

Money back trial offers: 5 gals. $6.25 f.o.b. Buffalo or write for Circular.

Distributors! Write for open territories.

HYGRADE FOOD PRODUCTS CORP.

Boothcote Div., 19 Stetson St., Buffalo 6, N. Y.

Lightweight Conveyor

A packaged conveyor system that can be erected and taken apart like an Erector set has been developed by the Lightweight Conveyor Co., 18690 Lauder Ave., Detroit 35, Mich., to meet the needs of both large and small manufacturers for conveying relatively small parts. The Lightweight Champion Monorail Conveyor can be operated as a bench, overhead, or even portable conveyor system.

No superstructure or handling equipment is required for installation of the conveyor. It weighs 3 pounds per foot, including rail, chain, and hangers, and has a carrying capacity of 25 lb./foot.

Flexibility is an outstanding feature of the Lightweight. It is produced in a variety of stand and rail length sections (10 feet maximum), curves, dips, and so on, which when combined will produce

UNDERCOVER AGENT!

Both steel boxes were top-coated with the same high-grade enamel; both had been cleaned thoroughly before finishing . . . but one had been primed with STANTITE. Then both were subjected to a salt spray under laboratory test conditions: after 93 hours the first box showed 75% rust failure—but the STANTITE-primed box showed no film failure after 500 hours!

Besides preventing corrosion and rust creep STANTITE Spraying Primer and STANTITE Clear Primer (for dipping) provide excellent adhesion to all types of surfaces . . . may be used with most types of top coats. Created for application under air-dried or baked finishes, STANTITE dries rapidly, is unimpaired by any baking schedules.

Find out now what STANTITE can do for your product . . . for complete information write today to the Stanley Chemical Company, East Berlin, Conn.

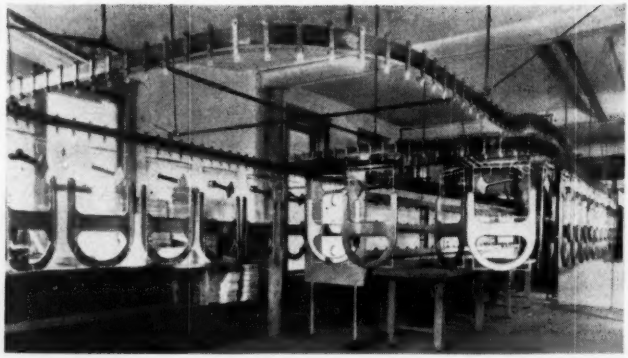
STANLEY

Industrial Coatings

STANLEY CHEMICAL

LACQUERS · SYNTHETICS · JAPANS · ENAMELS

Lightweight Flexible Champion Monorail Conveyor



any route flow desired. As requirements change, the system can be shortened, lengthened, or the route flow altered by merely adding, changing, or removing standard lengths and curves.

Polishing Tallows or Grease Sticks

The Hanson-Van Winkle-Munning Co., Matawan, N. J., has announced the development of a line of polishing tallows for the electroplating and polishing industry. Made of entirely new raw materials rather than mineral greases, waxes, oils, or other unsaponifiable materials, the tallows are available in three types.

According to the manufacturer, Tallow 5B41 is a material with excellent lubricating qualities, medium high melting point, and good saponification characteristics, being very easy to clean. Tallow 5B42 has even higher lubrication and saponification properties than 5B41 and is exceptionally easy to clean. Tallow 5B47 is highly saponifiable and gives good lubrication, it is stated.

Silver Sol-U-Salt

Sel-Rex Silver Sol-U-Salt for ornamental or defense silver plating has been announced by Sel-Rex Precious Metals, Inc., 229 Main St., Belleville, N. J. A pure, white, crystalline, free-flowing salt of known and definite chemical composition, it is used to make up new silver cyanide plating solutions or for metal replenishment in spent solutions.

Among the many advantages of Sel-Rex Silver Sol-U-Salt are: no harmful ingredients are introduced to the plating solution; it is added directly to the plating bath without filtering as it is free of residues of any kind; it does not affect the free cyanide content of the plating solution; it eliminates waste and hazard of handling dusty, readily air-borne powders; it permits convenient calculations, as 2 ounces avoirdupois of potassium silver cyanide contain 1 troy ounce of metallic silver; it eliminates rough deposits caused by insoluble residues; it is packed in plastic bags which can be removed from the outer container so as to eliminate all waste or contamination.

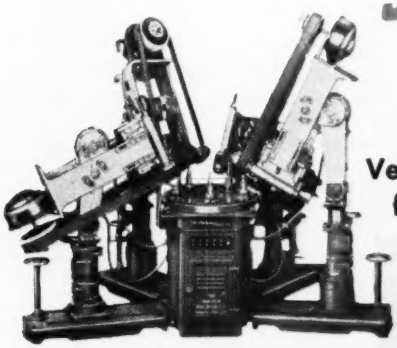
PLATERS RESEARCH
Control Systems
FOR THE ANALYSES OF PLATING SOLUTIONS
STANDARD ANALYTICAL REAGENTS
PLATERS RESEARCH CORP.
59 EAST 4th STREET NEW YORK 3, N. Y.

"Zinkrich"

A method of cold galvanizing for surface protection of steel and iron has been announced by the Chase Chemical Corp., 40 W. 29th St., New York 1, N. Y. Utilizing Zinkrich Cold Galvanizing Compound, the process has widely diversified applications in industry and for military uses, and may be used effectively on any structure, regardless of size.

Zinkrich, when applied to steel or iron surfaces, creates an electrochemical union, thus allowing zinc to become galvanized to the base metal surface. In cases where it is applied directly onto adhering rust, it is said to induce the rusted area to create its own protective, nonflaking coating, arresting further rust and preventing "rust creep".

THEY'LL EVEN DO YOUR SPECIALIZED JOBS!

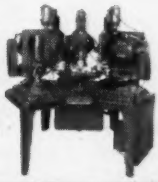


NO. 4-5 ROTARY INDEXING

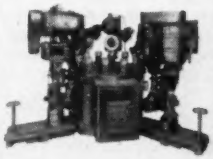
The #4-5 Rotary Indexing Packer-Matic equipped with abrasive belt heads. Uses buffs, polishing, tampico, wire wheels or belts.

For DOUBLE Efficiency . . .

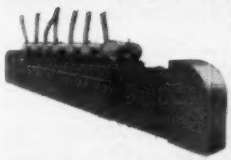
Versatile STANDARD Packer-Matics for routine jobs and "Specials"



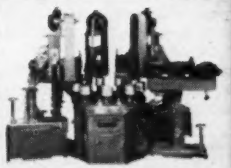
NO. 9-6 ROTARY INDEXING



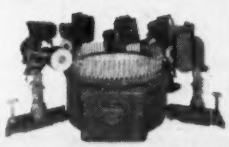
NO. 2-12 ROTARY INDEXING



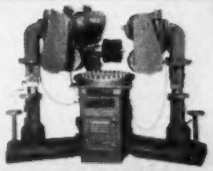
NO. 2 STRAIGHT LINE



NO. 14-9 ROTARY INDEXING



NO. 13 CONTINUOUS ROTARY



NO. 4-24 CONTINUOUS ROTARY

• Thanks to their extreme flexibility, Packer-Matics are giving a highly accurate, automatic finish to a far greater variety of items . . . and are saving industry thousands of man hours every day.

Jobs you've always considered too specialized for an automatic machine are routine tasks for the versatile standard Packer-Matic. Silverware, household appliances, cosmetic accessories, hardware, plumbing supplies . . . regardless of shape, metal, or finish no job is too difficult.

Call on Packer-Matic engineers for information . . . and instruction in up-to-the-minute buffing techniques. Like the performance of our machines, the service of our engineers can help you add hours of efficient production to every working day.

AUTOMATIC

PACKER-MATIC

AUTOMATIC MACHINES FOR BUFFING • POLISHING • DEBURRING • GRINDING

THE PACKER MACHINE COMPANY • MERIDEN, CONN.

Zinkrich is applicable directly to the object with an ordinary paint brush, spray gun, or cold dip. No special equipment is needed.

One of the important advantages of the process pointed out by the manufacturer is its ability to give electrical continuity through its layers of zinc.

Grinnell-Saunders Diaphragm Valves

The Dow Chemical Company announces the development of saran-lined Grinnell-Sanders Diaphragm Valves for handling corrosive fluids and gases.

Special castings designed for the purpose are lined with B-115 saran, the same material used in saran-lined pipe and fittings. They are furnished normally with diaphragms of saran rubber, but diaphragms of natural rubber, Neoprene, butyl, hycar, and white Neoprene are supplied optionally for special conditions. For extremely corrosive conditions and for high temperatures, diaphragms of Kel-F can be furnished.

The valves are available in sizes 1 to 6 inches inclusive, with flanged ends, and are usually equipped for hand-wheel operation. Quick-opening lever operators, electric motor and air motor operators are readily available.

Distributor of these valves, as well as saran lined pipe, fittings and plug valves, is the Saran Lined Pipe Co., 2415 Burdette Ave., Ferndale 20, Michigan.

PRODUCT LITERATURE

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

Paint-Miser. Ashdee Products, Inc., 18029 Dixie Highway, Homewood, Ill., has issued a four-page, two-color folder which describes the Paint-Miser, an electronic accessory for paint spray equipment. Diagrams and photos illustrate the adaptation of the Paint-Miser to present finishing equipment and installations.

Alumiprep. Neilson Chemical Co., 6561 Benson St., Detroit 7, Mich., has prepared **Alumiprep Bulletin 50-62** which discusses Alumiprep, a general all-purpose metal conditioner for aluminum alloys, available in wipe-off and dip grades.

Constant Temperature Baths. Two types of general purpose, accurately controlled water baths designed for a variety of special or general applications are described and illustrated in a folder prepared by Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Maryland.

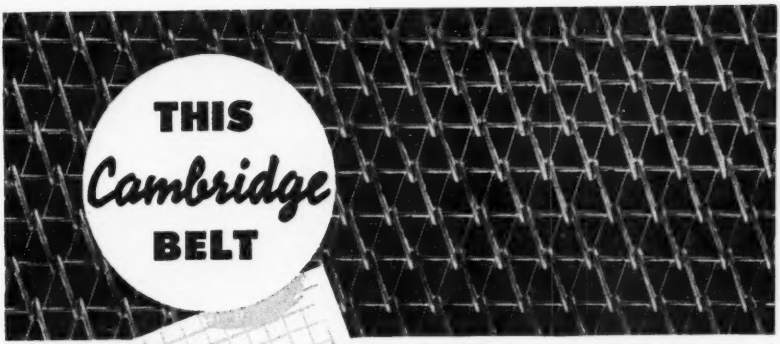
"How Pittsburgh Industrial Brushes Save Industry Money" is the title of a 32-page manual prepared by the Pittsburgh Plate Glass Co., Brush Div., Dept. W-6, 3221 Frederick Ave., Baltimore 29, Md. To illustrate how Pittsburgh engineering solves difficult brushing problems twelve typical installations are shown and described.

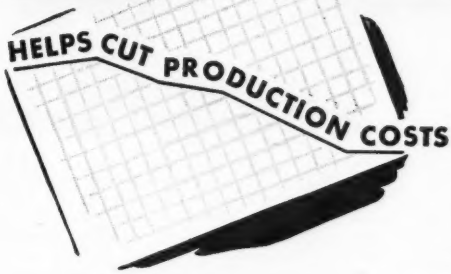
For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.





. . . in brazing, galvanizing, annealing, tempering or other high temperature installations. *Rod-Reinforced* construction means highest tensile strength, low thermal capacity, straight belt travel. Open mesh allows free heat circulation or drainage of process solutions.

Regardless of your specific process, there is a Cambridge woven wire conveyor belt to combine movement with processing of parts or materials.

Woven from any metal or alloy to the mesh or weave that best suits your operating conditions . . . heat, cold or corrosive agents . . . Cambridge belts are constructed to rigid specifications based on our experience in your industry. And any Cambridge belt can be equipped with special drive connections, retaining selvages, cleats, or other attachments for your particular process.

FREE CATALOG. Basic reference manual on conveyor design, belt construction and metallurgy. Write today or call your nearest Cambridge office. See "Belting—Mechanical" in your Classified Telephone Directory.

The Cambridge Wire Cloth Co.

WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

Department A
Cambridge 5,
Maryland

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

A Check List for Solvent Waste, designed as a reminder card to be displayed on finishing room bulletin boards, is available from the Electrochemicals Department of E. I. du Pont de Nemours & Co., Wilmington, Delaware. The card lists eleven conditions to be checked in connection with operation of a trichlorethylene degreaser at maximum efficiency.

Electro-Cupralum Anodes are the subject of an illustrated pamphlet prepared by Alfred P. Knapp, president of Knapp Mills Inc., 23-15 Borden Ave., Long Island City 1, N. Y. Entitled **"Current Developments and Improvements in Chromium Plating Processes and Procedures,"** the paper refers particularly to chromium plating, although much of the data are equally applicable to other electrochemical processes where lead may be used as an anode or cathode.

"Instruments Accelerate Research." The acceleration of research through the use of industrial and related instruments and apparatus is the subject of an 8½ by 11, 84-page book published by Brown Instruments Division of Minneapolis-Honeywell Regulator Co., Philadelphia 44, Pa. The book describes, for what is believed the first time, many types of equipment which, alone or in combination with other apparatus, are being used in research and analytical studies. In addition to its use as a reference and application guide for researchers and analysts, **Bulletin 15-14** reflects the great strides made in the instruments field since World War II. It also emphasizes how extensively industrial instruments are being used alone or in combination with others for technical, engineering and laboratory work.

The book is replete with known research and analytical instrumentation uses. Under the heading of Analytical Apparatus, the book details the robotized polarograph, titrator and still applications, and describes various types of spectrometers. It also covers continuous gas analyzers. The section on Precision Laboratory Measuring Instruments includes mention of electronic indicators, the Electrometer, pyrometers for measuring low temperatures, and radiation pyrometers for measuring temperatures up to 7,000 degrees F., in addition to information on high vacuum gages, and pressure and force transducers. A third section reviews research apparatus components such as converters, balancing motors and servo amplifiers which constitute integral operating parts of research and analytical apparatus.

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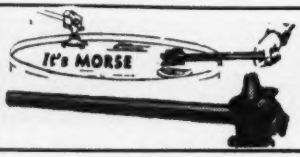

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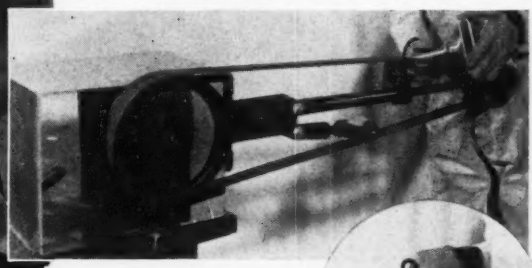

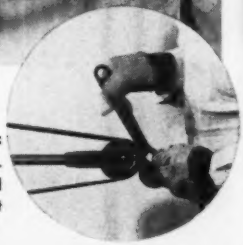

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"Alodizing with Alodine" is the title of a four-page folder available from the American Chemical Paint Co., Ambler, Pa. Protection for both painted and unpainted aluminum is stressed, and photographs, drawings, and charts augment the process and performance data presented in the text.

Determination of Impurities in Electroplating Solutions. The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., has available A.E.S. Research Report Serial No. 3. Contained in the 48-page bulletin are the following: Colorimetric Techniques; Determinations of Lead, Iron, Manganese, and Copper in Nickel Plating Solutions.

Purico Pur-Bur Composition. The Puritan Mfg. Co., 29 Benedict St., Waterbury 65, Conn., has issued a data sheet covering its self-lubricating compound, Pur-Bur, which will remove burrs, gouges, cracks, and so on, very easily and still provide a very close and accurate finish, quickly and smoothly.

"Heavy-Duty Alkaline Cleaning of Ferrous Metals." The Special Chemicals Department, Pennsalt Chemicals, 1000 Widener Bldg., Philadelphia 7, Pa., has available an illustrated booklet which describes in detail approved methods for alkaline soak tank cleaning, alkaline spray cleaning, and alkaline electrolytic cleaning, barrel cleaning, steam gun cleaning, and manual cleaning of walls and floors. Procedures to be followed are fully described, including recommendations for proper cleaners to be used for specialized purposes.

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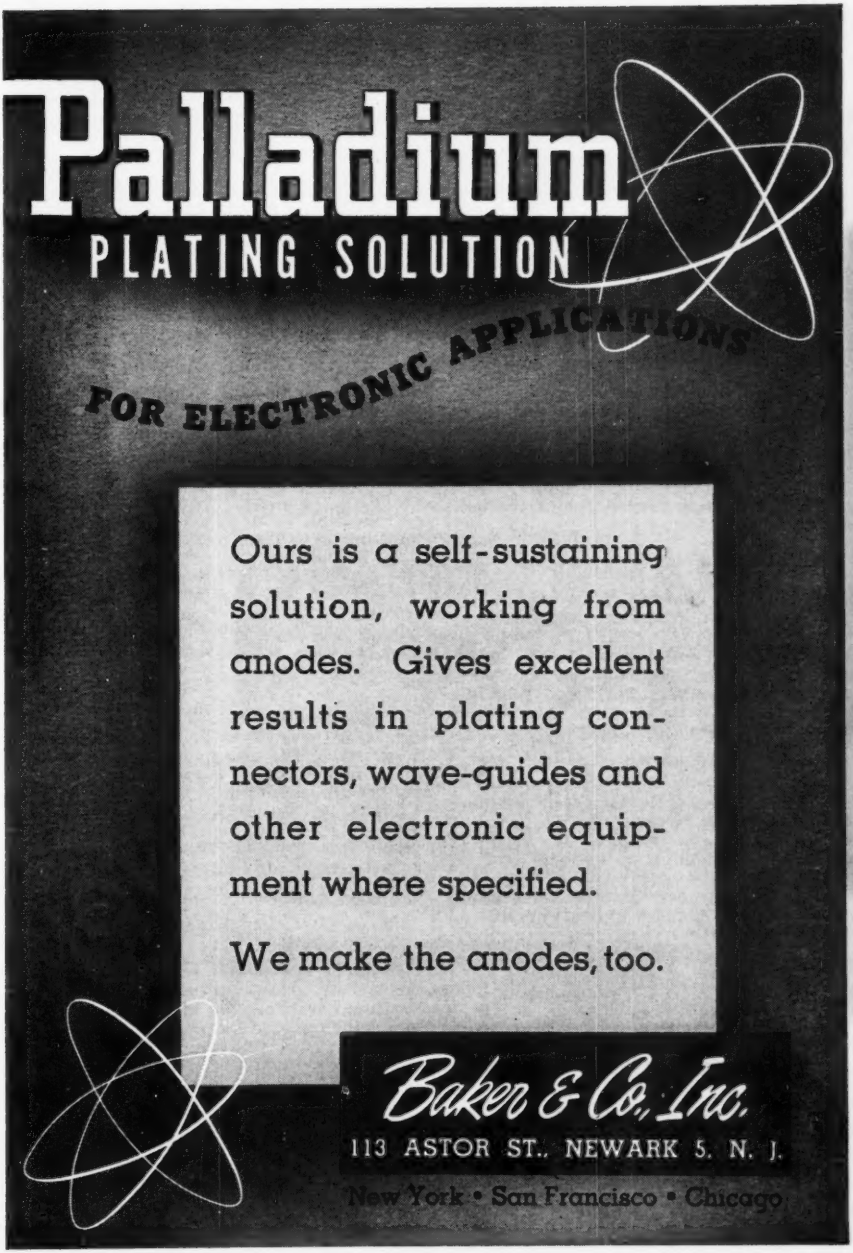
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For more complete information on products and processes use READER SERVICE CARDS inside covers.

Humidity Cabinets. Bowser, Inc., Refrigeration Div., Terryville, Conn., has prepared a bulletin describing its Relative Humidity Units in which humidity is maintained automatically at 20 to 95 per cent between 35 and 175 degrees Fahrenheit.

Oakite Solvent Detergents. How solvent detergents provide outstanding benefits in hundreds of industrial cleaning applications is discussed in a 24-page illustrated booklet issued by Oakite Products, Inc., 120 Thames St., New York 6, N. Y.

Enamel Finish. Advantages in using Neolac "600" Enamel Finish are described in detail in **Bulletin 239** available from The U. S. Stoneware Co., Akron 9, Ohio. The four-page three-color bulletin also provides complete instructions for applying the quick drying enamel finish.

"Manual of Laboratory Safety" is the title of a 40-page booklet announced by the Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa. Useful in the implementation of complete laboratory safety programs, the newly revised, well illustrated edition includes recently developed data, techniques, and equipment.

"Stempel" Fire Extinguisher Catalog and Manual. M. L. Snyder & Son, Jasper & York Sts., Philadelphia 25, Pa., has available an 80-page pocket-size booklet containing facts and pictures, descriptions, and pertinent information regarding every type of fire-fighting equipment.

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Belt Surfacers. Several types of wet and dry felt surfacers are presented in literature obtainable from the Porter-Cable Machine Co., 1708 N. Salina St., Syracuse 8, New York.

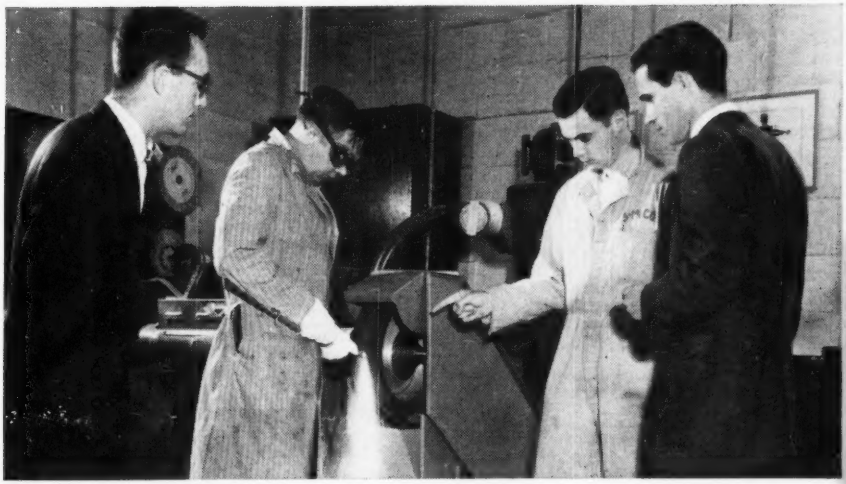
Fischer & Porter Revised Catalog 96, illustrating and describing the redesigned Magna-Sight Flow Gauge, can be obtained from the Fischer & Porter Co., 96 County Line Rd., Hatboro, Pennsylvania.

Corrosion Proof Linings Bulletin No. 4-1, prepared by the Atlas Mineral Products Co., 42 Walnut St., Mertztown, Pa., describes sheet linings, solution or dispersion linings, brick sheathings, and miscellaneous linings.

Speedline Fittings. Corrosion-resistant fittings are described in an eight-page booklet published by Horace T. Potts Co., Erie Ave. and D St., Philadelphia 34, Pa. In addition, the booklet shows how light-walled Schedule 5S corrosion-resistant piping reduces the cost of a typical piping layout.

Vapor Degreasing. Production men and engineers will be interested in a 28-page booklet entitled **"Vapor Degreasing Questions and Answers Handbook,"** prepared by the Phillips Manufacturing Co., Dept. D, 3475 W. Touhy Ave., Chicago 45, Ill. Illustrated throughout, the handy reference thoroughly covers the subject of vapor degreasing with respect to solvents, methods, and equipment.

Penfield Water Demineralizers. A folio containing catalog sheets and other pertinent information regarding Penfield ion exchange systems ranging in capacity from 30 gallons per hour to 1,000 gallons per hour can be obtained from Penfield Manufacturing Co., Inc., 19 High School Ave., Meriden, Conn. Each catalog sheet, in addition to containing a photographic illustration and working diagram of a particular model Penfield Industrial Demineralizer, also lists a complete description of parts, and features both a Specification Chart and a Performance Chart.



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Air Pollution Control. R. J. Ruff, president, Catalytic Combustion Corp., 4544 Grand River Ave., Detroit 8, Mich., has prepared a bulletin concerning the elimination of fumes discharged from paint baking ovens entitled **"Catalytic Combustion of Hydrocarbon Vapors."**

Acrylic Polymers. Industrial Chemicals Div., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has issued a technical data bulletin describing its acrylic polymers, outlining their properties, and their compatability with surface active agents and colloids.

Industrial Work Gloves. American Rubberizing Co., 617 11th Ave. S., Minneapolis 4, Minn., has released a four-page colorful bulletin describing the processing of canvas and cotton knit gloves with natural rubber, Neoprene, or plastic. Ranges of styles, sizes, and colors available are listed, plus descriptions and applications of each.

"Immunol," a liquid chemical which when added to hot or cold water aids cleaning and prevents rusting of ferrous metals, is described in a ten-page, two-color folder released by the Haas Miller Corp., 4th & Bristol Sts., Philadelphia 40, Pa. Having unusual detergent properties and complete "wetting out" action, Immunol is odorless and neutral, contains no soaps or alkalies, is non-flammable, and will not affect the skin. It can be used in place of alkali cleaners and flammable solvents.

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Lumetron Photoelectric Colorimeter Model 401 for accuracy, ease and speed of operation in colorimetric and turbidimetric analysis is the subject of **Bulletin No. 409** prepared by Photovolt Corp., 95 Madison Ave., New York 16, N. Y. Detailed technical information is included, together with a price list.

Naz-Dar Squeegee Sharpener for the silk screen printer with an automatic press or large volume production is described and illustrated in a folder obtainable from The Naz-Dar Co., 461 Milwaukee Ave., Chicago 10, Illinois.

Metal Spinning and Fabricating. The mechanics of spinning, the characteristics and range of this process are described and illustrated in detail in **Data Book No. 3,** published by Spincraft Inc., 4122 W. State St., Milwaukee 8, Wis. Also presented are the facilities of Spincraft for engineering, designing, and fabricating products by spinning methods.

Duplex Film Applicator, a new instrument for matching colors and for comparison of gloss and opacity, is the subject of a four-page bulletin published by Henry A. Gardner Laboratory, Inc., Bethesda 14, Md. Full details are given.

Automatic Spray Painting Machine. Sepanski & Associates, 409 Henry Ave., S. E., Grand Rapids, Mich., has issued **Folder No. 9-PP** describing the Automatic Spray Painting Machine, designed for use with standard types of spray masks, which mechanically and automatically applies paint finishes and decorative designs at production line speed.

Chromelike Bright Finishing System. A detailed technical bulletin on the use of zinc plate and Iridite chromate chemicals to replace conventional chrome plating in producing bright decorative finishes has been released by Allied Research Products, Inc., 4004-4006 E. Monument St., Baltimore 5, Md. Comparisons of the appearance, corrosion resistant and abrasion resistant characteristics of the finished surface are set forth.

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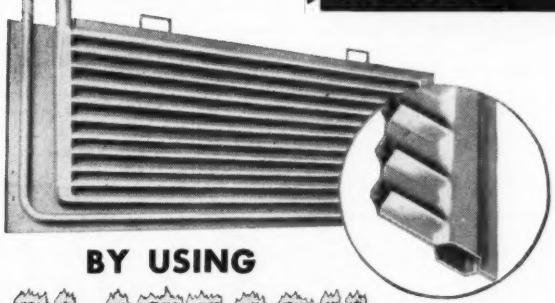

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TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

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The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

Why Platecoils Cost Less

LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction.

EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

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A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

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Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

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Electroplating—for the Metallurgist, Engineer and Chemist. By J. B. Mohler and H. J. Sedusky. Published by the Chemical Publishing Co., Inc., 212 Fifth Ave., New York 10, N. Y. 250 pages. Price, $5.00.

The two authors with long and varied experience in the wide field of electroplating have pooled their knowledge to write a practical book on this important subject especially for the technical man, metallurgist, engineer and chemist who have electroplating problems.

The book discusses all the important aspects of practical electroplating without going into the involved details of electrochemical theory. The necessary fundamentals, such as bath voltage, polarization, and current distribution, are discussed, but they are presented in simple nontechnical language.

Characteristics of plating baths, behavior of electric current during plating, deposit, composition of common plating baths, control methods and analytical procedures are well covered. Special chapters are devoted to alloy plating, continuous plating, diffusion coatings, copper plating for selective carburization, and commercial applications. The most frequently encountered plating troubles, their causes, and measures for avoiding them are treated in a separate chapter.

The operating details of common plating baths are described in the light of recent improvements. Some new methods and techniques have also been presented whose source is the authors' experience in electroplating.

Hard Chrome Plating Unit. Features, operation, and advantages of the Model A-20 Chromaster are described and illustrated in **Bulletin IC 20** prepared by the Ward Leonard Electric Co., Industrial Chrome Div., 31 South St., Mount Vernon, New York.

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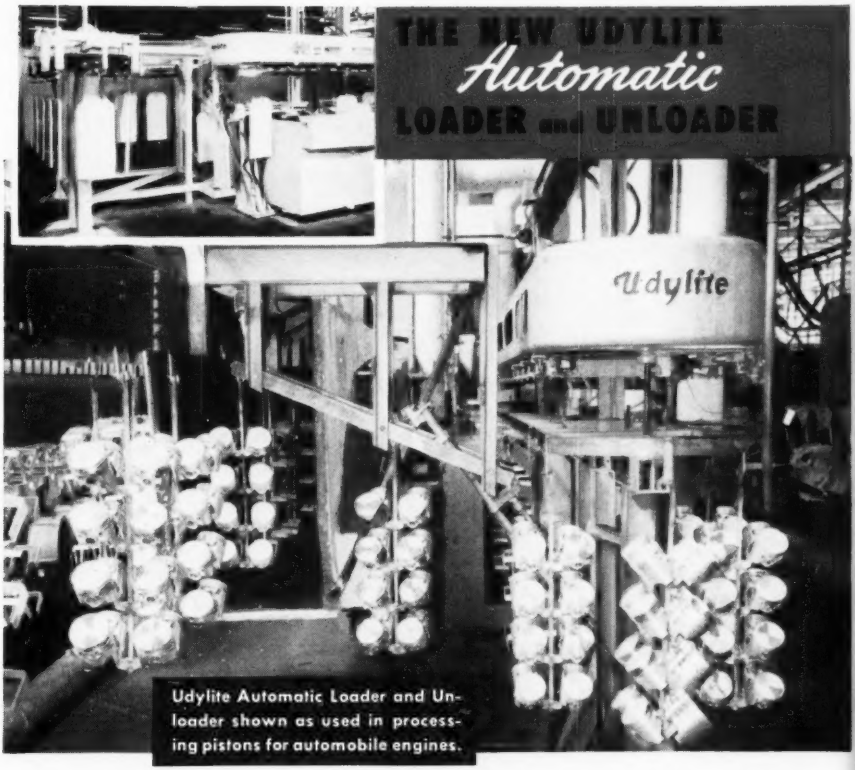

Udylite Automatic Loader and Unloader shown as used in processing pistons for automobile engines.

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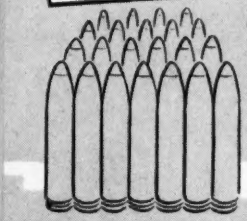
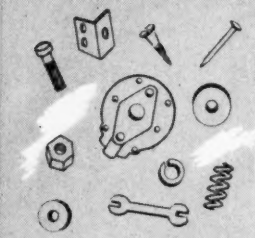
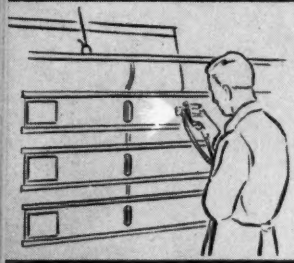


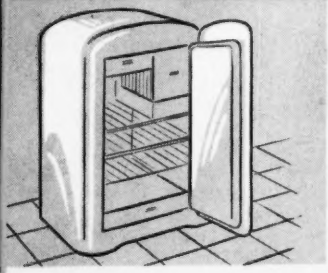
● Ammunition must be produced faster than ever before! Regardless of processing specifications, Detrex can furnish equipment or chemicals to meet ordnance requirements.



● Where military orders call for metal parts to be rustproofed, Detrex PERM-COTE (phosphate coating process) will produce results beyond specifications.



● Finishing departments operate efficiently when paint spray booths are functioning properly. To secure maximum production hours, precoat booth walls with Detrex PRD or VINCOTE. Paint overspray then becomes a minor maintenance problem.



● For cleaning prior to painting, plating, heat-treating, or inspection, finishing superintendents depend upon Detrex products and processes for both defense and civilian goods. For complete information on degreasing, alkaline and emulsion cleaning, rustproofing, contact Detrex now!

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